PULP & PAPER

NOVEMBER 1960

The Future Paper Machine

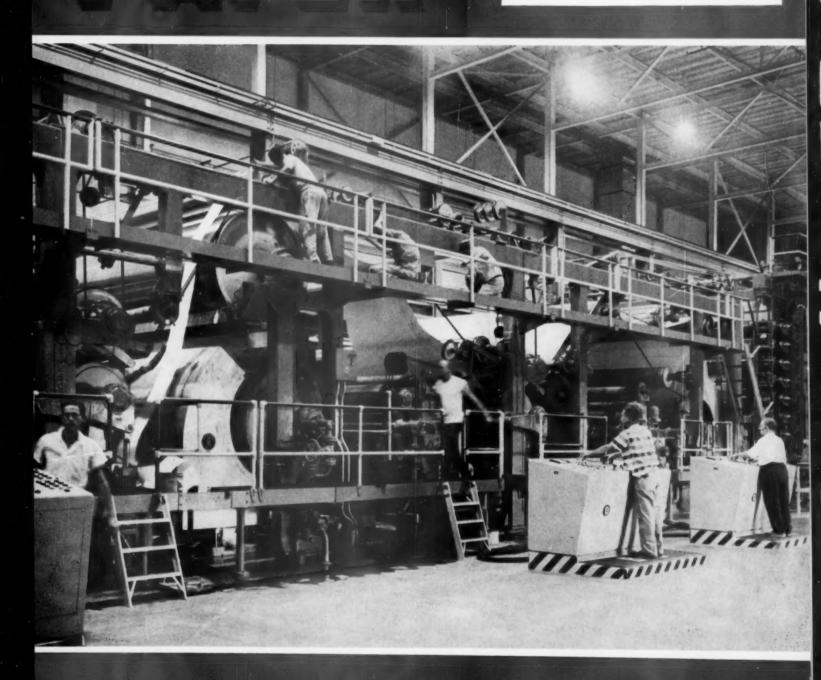
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Ultra Sonic Defibering

page 95

World Forestry Congress

page 109



MARATHON'S BLEACHED BOARD MACHINE STARTS UP

238 in. wide Fourdrinier has 3 blade coaters, 7 velocity dryers

see page 76

New effectiveness in DISC REFINING



NORTH AMERICAN MILLS are discovering advantages present only in the Raffinator Disc Refiner for getting highest strength development in all kinds of pulp at consistencies up to 20%.

For example, the Raffinator's exclusive hydraulic control system provides absolute uniformity of clearance between the plates at all points. The rotating disc is positioned with positive, constant control — can be operated at a fixed clearance or on a floating principle to accommodate varying stock pressures. Through a clearance indicator, screen plate settings are conveniently seen magnified 80 times.

Split shell facilitates setting the rotor and static discs in perfect alignment at tolerance of .0001" or less. Oversize shaft prevents deflection.

Rugged, dependable and efficient, the Raffinator comes complete with electrical system, control panel and automatic safety devices. All parts exposed to stock are made of stainless steel.

Currently proving its effectiveness in over 600 European installations, this high precision disc refiner, an Asplund invention, is engineered and manufactured in Sweden by Aktiebolaget Defibrator. It is now made available to North American mills by Bolton-Emerson.

Get all the facts about the Raffinator Disc Refiner
from The Emerson Manufacturing Co., Division of
John W. Bolton & Sons, Lawrence, Massachusetts.



Even old Sol envies



Rice Barton Dryer Sections

The most efficient drying systems under the sun are another Rice Barton contribution to papermaking progress. Once considered neglected and costly, today drying capacity can be stepped up substantially by improved location and spacing of dryers and the proper combination of steam and air units.

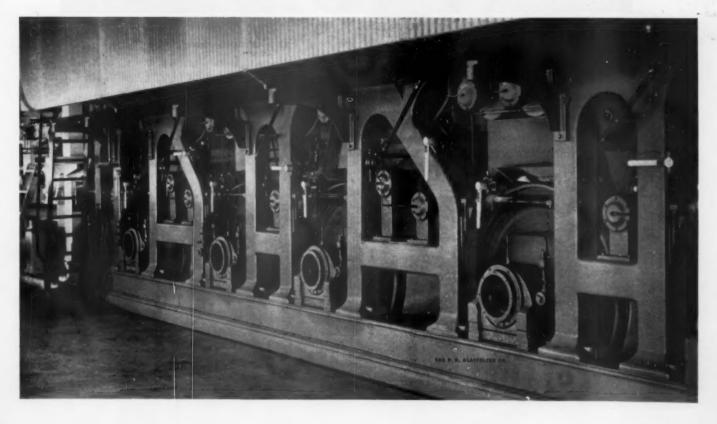
Furthermore, thermal efficiency can be increased and dryer sections shortened on both new installations and modernization of old.

Experience gathered since 1837 has made Rice Barton dryer experts, particularly leading the industry in perfecting Air Drying. Let us explain the flexibility and economy with which you can increase your capacity. Write for latest information.

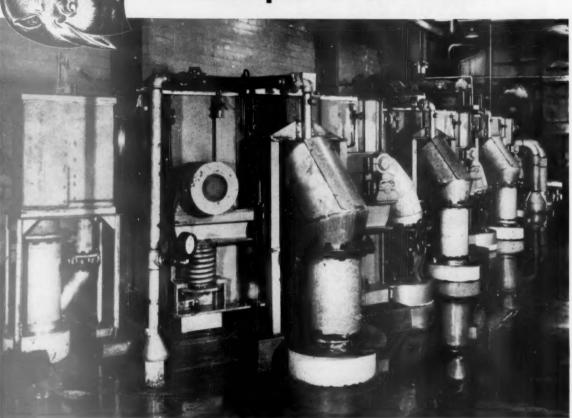


Rice Barton corporation . Worcester, MASS.

FOURDRINIERS, PRESS SECTIONS, DRYER SECTIONS, CALENDERS AND SUPERCALENDERS, REELS, WINDERS, HEAD BOXES, SIZE PRESSES, BREAKER STACKS, DIFFERENTIAL DRAW CONTROL DRIVES AND CONE PULLEY DRIVES, PULPING EQUIPMENT, HIGH VELOCITY AIR DRYERS, TRAILING BLADE COATERS, FIBRE-FLASH DRYING SYSTEMS



A whale of a lot of fine screening* in small space at low cost ...



These three Bird Vibrotor Screens with fine slotted plates are handling first quality bleached kraft of high consistency at the rate of 240 tons per day. A bank of flat screens would occupy ten times as much space. Savings in piping, pumping and power are correspondingly great. Cost of maintaining these all-stainless steel screens is exceedingly low.

*For example, through .012" slots:

Unbleached sulphite at 1.5% — 55 tpd
Bleached sulphite at 1.6% — 68 tpd
Unbleached sulphate at 1.6% — 58 tpd
Bleached sulphate at 1.9% — 80+tpd
Unbleached hardwood at 1.5% — 100+tpd
Deink at 1.9% — 100+tpd

NEW on the pre a copy?

on the Vibrotor Screen is just off the press. May we mail you a copy?



BIRD MACHINE COMPANY

SOUTH WALPOLE, MASS.

REGIONAL OFFICES: EVANSTON, ILLINOIS PORTLAND, OREGON • ATLANTA 9, GEORGIA

Canadian Manufacturers of Bird Machinery
CANADIAN INGERSOLL-RAND COMPANY, Limited, Montreal

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Naheola's New Paper Machine



Adding further impetus to on-machine coating of Southern bleached kraft is this new paper machine with three trailing blade coaters and seven high velocity dryers. Mill also features fivestage bleaching, unusual instrumentation and centralization of chemical preparation and color preparations systems.

How Paper Machine Will Change 87



Some surprising opinions are expressed by Dr. Börje Steenberg of Sweden as to what paper machines will be like in the future. He foresees minor changes more than radical changes, that the machine width determination is most important. Good bets are high velocity drying and modified papermaking methods (like Inverform).

90 **Progress Continues at Billeruds**



This leading Swedish pulp and paper company is busy adding a new paper machine at its Gruvön mill. Other additions include a six stage continuous bleaching plant (with two stages of ClO₂) and a new economizer on the recovery boiler which helps to reduce maintenance.

Fifth World Forestry Congress



109

The progress and problems in forestry in every continent were discussed by some 2,000 foresters from the world over who attended this meeting in Seattle. The significance of the Congress and some of the more important topics touched on are explained by P&P's Western Editor Louis H. Blackerby, a graduate forester.

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Removes water efficiently without crushing

Another paper mill that's getting longer service, better paper formation with B.F.Goodrich couch rolls

THE covers of B.F. Goodrich couch rolls are made of a special rubber, tough enough to stand years of use, yet soft so the rolls couch perfectly without causing any crush marks. The result, of course, is smoother, more uniform paper formation.

In addition to better performance, B.F.Goodrich couch rolls have many cost-saving advantages. There's no danger of rust spots staining the felt or sheet because the ends of the rolls are sealed against moisture. This special end seal also reduces edge checking

and cracking, so B.F.Goodrich rolls do not need to be reground as frequently as other rolls.

Cover separation is impossible because the rubber is locked to the steel roll by the exclusive B.F. Goodrich Vulcalock process, the strongest rubber-to-steel adhesion that is known today.

Shown above is just one of the many B.F.Goodrich couch rolls in use at Michigan Catton Company, Battle Creek, Michigan. Some of these BFG rolls are now in their twelfth year

of trouble-free service at this mill.

Let a B.F.Goodrich representative show you how longer-lasting paper mill rolls can improve the quality of your paper and save you money. B.F.Goodrich Industrial Products Co., Dept. 11-872, Akron 18, Ohio.



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The Editor Reads His Mail



Address letters to The Editor, PULP & PAPER, 1791 Howard St., Chicago 26, Ill

Apparently the Germans Were Still the First . . .

Editor: On page 73 of the August issue of PULP & PAPER in your account of the Zellcheming technical meeting of the German pulp and paper industry in Garmisch, Germany, the statement is made that "the Garmisch meeting saw the first stereo electron micrographs of pulp, prepared by Dr. Georg Jayme (director of the cellulose chemistry division of Technische Hochschule Darmstadt) and his assistant, Dr. G. Hunger." For the record, stereo electron micrographs of pulp fibers, made on the scanning electron microscope of the Pulp & Paper Research Institute of Canada, were shown to delegates at the Canadian Annual Technical Section conference in Montreal in Janu-1960 during a discussion by K.C.A. Smith of the Institute.

R. A. JOSS

Assistant Executive Secretary Canadian Pulp & Paper Assn. EDITOR'S NOTE: It is difficult to get ahead of the Canadians, who have a remarkable record of technical "firsts" and of genuinely new developments over many years! While we erred in crediting the Garmisch showing of these pictures in June as being "first," Dr. Jayme and his associates in Darmstadt first showed stereo electron micrographs of pulp fibers at the Darmstadt's institute's Jubilee celebration in May of 1958, about two and one-half years ago.

Tasman is NOT in Tasmania

-Jacksonville, Florida Editor: On page 91 of the Sept. 1960 issue of P&P, the article on Bowaters states that the Bowater organization has mills "in such faraway places as Tasmania."

You have confused the Tasman P&P Co. in New Zealand (where Bowaters is) with Tasmania, a state in Australia. Bowaters is not in Tasmania.

I. E. WOODMAN Industrial Forester

Grewin System is Exclusive

Editor: I was interested in reading the article on Nicolet Paper Co., in the September issue of PULP & PAPER but I was surprised to see the word "Grewin" used in connection with the picture at the bottom of page 103. Grewin is a trade name used exclusively by Ross Engineering. It is derived from Mr. Grewin's patent on an air system to remove vapors from the pockets of a paper machine.

WM. METCALFE Vice President - Sales J. O. Ross Engineering

EDITOR'S NOTE: We regret this error and are happy to be able to correct it. This is another case of a patent having become so famous that its trademark name tends to rather promiscuous use in the industry.

Another First?

-Appleton, Wisconsin Editor: the August 1960 PULP & PAPER on the cover has as one of the headings "First Bleaching Conference." If you will look back at PULP & PAPER for November of 1955, you will find that almost the same thing is said about another TAPPI Interna-tional Bleaching Conference which was sponsored by the Fundamental Research Committee of TAPPI plus the Pulp Purification Committee and was held at the Institute. About the same number of people attended this first conference, and many of the same people were on hand for the second one. At this first conference, a list of unsolved bleaching problems was set up; many have received attention since then and some have been solved.

Your report in the August issue of this year on the Bleaching Conference is a good one and I read it with interest. Your report of the 1955 meet-

ing was also a good one.
HARRY F. LEWIS Vice President The Institute of Paper Chemistry

Fiber Going to Waste

-Merida, Yucatan, Mexico Editor: I would very much appreciate receiving any literature about research in the use of sisal fiber waste as this state of Yucatan is the producer of over 100,000 tons of sisal fiber for manufacture of twines, ropes and bags in cordage mills. There is a considerable amount of waste in the plantations and of extraction and other material from fiber equipment plants. We would like to use this waste to make paper or cellulose.

C. G. MARQUEZ Calle 5, No. 501



Pulp from Gottesman means...

EXPERIENCE!

Bleached and Unbleached Sulphite • Bleached Hardwood • Groundwood Bleached, Semi-Bleached, and Unbleached Kraft

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MONTHLY REPORT - WORLD NEWS

ADDITIONAL HIGH-QUALITY GRADES . . . bleached sulfite pulps to be made at Grays Harbor, Wash. mill, Weyerhaeuser Co. Changes underway. Project results from extensive research, commercial production, evaluation. Heart of process: two-stage magnesium base cooking. Also: additional chlorine dioxide bleaching facilities. Target date: Spring 1961.

SIMULTANEOUS PINE, HARDWOOD PULPING... to be possible following \$1,750,000 project at Halifax Paper Co., Roanoke Rapids, N.C. Total rated capacity increases from 740 to 800 daily tons. Additional 100 cords pulpwood will be required daily. General contract to Rust Engineering Co. Additions include two digesters, pulp washer, lime kiln, auxiliary equipment. Also: improvements to causticizing.

NEW WASTE TREATMENT SYSTEM . . . under construction at Rome Kraft Co., Rome, Ga. Said to be vast improvement over existing installations. Will serve increased pulp- and paper-producing equipment, power installations now underway. Result of two-year pilot plant study. Details to be released.

"WORLD'S LARGEST" IS CLAIM . . . for single sulfite recovery system under construction at Rayonier Inc.'s sodium base sulfite pulp mill, Hoquiam, Wash. Goals: chemical recovery, pollution abatement. Said of Rayonier-developed process: it "will permit recovery and re-use of at least 85% pulping chemicals and provide especially pure effluent . . . " Erection contract to Chicago Bridge & Iron Co. Sextuple-effect evaporator removes 200 tons water hourly from spent red liquor. \$1,000,000 installation part of \$7,500,-000 project converting plant to sodium base sulfite from ammonia base. Target date: early 1961.

HURRICANE DONNA DESTROYED . . . more than \$1,000,000 in Florida timberlands, says state forest service, Lakeland.

TIMBER CUT AT RECORD HIGH . . . on National Forests. During fiscal 1960 cut was 9.3 billion board ft. with value of \$148,000,000, as compared to 1959's 8.3 billion at \$114,000,000. Sales up 30%, most of increase atributed to long-term sale of 3 billion board ft. pulpwood in Southwest.

THIRD MACHINE ON LINE . . . at International Paper Co.'s Pine Bluff, Ark. mill. Products: newsprint, telephone directory paper.

BLEACHED KRAFT MILL . . . for Rayonier Canada Ltd. fast building at Woodfibre, B.C., where firm operated sulfite plant. Facility brings to \$35,000,000 amount Rayonier has invested in new plant, equipment in recent years.

PENNSYLVANIA PAPERMAKER ACQUIRES . . . two eastern seaboard firms. Hammermill Paper Co., Erie, purchases Union Envelope Co., Richmond, Va., and assets of Old Colony Envelope Co., Westfield, Mass. (Hammermill owned 60% of Old Colony's outstanding stock.)

SET FOR INSTALLATION . . . is 25,000-ton enamel printing paper machine in \$8,-000,000 expansion at Whiting, Wis. plant, Consolidated Water Power & Paper Co. . . Scheduled for Enlargement: Wisconsin River div.'s boiler house, groundwood pulp and bleach departments, coating plant, finishing, stores. Target date: September 1961.

SETTING SIGHTS WEST . . . Keyes Fibre Co., Waterville, Maine, to build molded pulp products plant in Sacramento, Cal. Annual payroll: \$1,000,000. Will supplement production in Maine and Indiana.

GROWTH OF NEWSPRINT AS ADVERTISING MEDIUM . . . has outstripped growth of commercial TV during latter's lifetime. Says Charles T. Lipscomb Jr. of ANPA:
". . . newspapers will continue to grow at even faster pace in the 60's. . . ."



REPORT
NO. 12,106
NEW PAPER
MACHINE
SECTIONS
OILGEAR
CONTROLLED

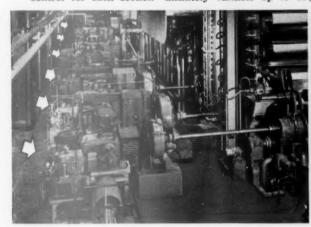
From Oilgear Application-Engineering Files

HOW HYTAC' SYSTEMS PRECISELY CONTROL SECTION SPEEDS OF VERSATILE NEW PAPER MACHINE

BUILDER: Paper Machine and Differential Drives - Beloit Iron Works, Beloit, Wis.

DATA: Systems to individually vary and precisely control speed and draw on six sections of a new, versatile, 192-in., 90-ton capacity, Beloit fourdrinier paper machine designed to produce a variety of finished stock ranging from 33-lb toweling up to 190-lb food board. For 200- to 2000-fpm production operation—a range not previously considered practical—main lineshaft speed to be adjustable over this 10:1 range. Beloit mechanical differentials to be used at each section. REQUIREMENTS: 1. Precise speed and draw control for each section—infinitely variable up to 10%

under main lineshaft rpm—from simple, remote, pushbutton control panels. 2. Maintain each selected section speed within $\pm 0.25\%$ max. variation over a 50% load change at max. lineshaft speed. 3. Must be compact; frugal on electrical power input; insure trouble-free, continuous, heavy-duty, full-production paper machine drive service, and still provide maximum adaptability for short runs. 4. Be impervious to high humidity and high-pressure washdowns. 5. One reputable source and responsibilty for these speed and draw control systems preferred.

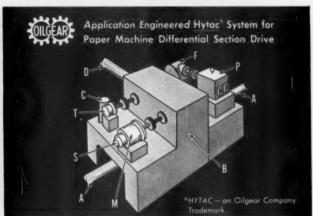


Drive side of this versatile, new paper machine."... to give perfect draw and speed control over an unprecedented wide range"... six Beloit differential drives incorporate HYTAC* Systems—indicated by arrows. This machine consumes approx. 39,000 tons of pulp per year in the production of grades ranging from 33-lb bleached and unbleached toweling to 190-lb coated or calendered food board.

SOLUTION: Application-Engineered HYTAC* controlled differential drives provide precise, individual speed control on each of the following six sections of this new paper machine—20-hp Oilgear Any-Speed Drives on size press, 4th dryer, winder reel; 35-hp drives on 3rd dryer, 1st calender, 2nd calender. A typical HYTAC* and Beloit differential section drive and its components are shown schematically, right.

These systems maintain any selected, individual section speed with less than ±0.25% variation regardless of load change over the entire 10:1 range of lineshaft speed . . . plus enabling operators to infinitely vary each section's drive rpm independently up to 12% under main lineshaft rpm.

A special slack take-up feature facilitates rapid change-over on short runs. This "Oilgear-Plus" feature operates from a momentary, over-ride, control panel pushbutton to rapidly take any one or all sections from threading speed to the desired production speed. Other "Oilgear-Plus" features are: 1. Cushioned, controlled starting, accelerations, deceleration, braking. 2. Positive, automatic overload protection. 3. Constant pressure and flood lubrication with continuous power fluid filtration. 4. A heavy-duty, long-lived, trouble-free, efficient, sealed system—impervious to high humidity and washdowns. 5. Complete freedom from maintenance-provoking belts, chains, or relays.



HOW DRIVE WORKS: One of the six combined HYTAC* and Beloit differential drives is shown schematically above. The turbine-drive lineshaft (A) drives all Beloit Machanical Differentials (B). Controlled Fluid Power is delivered by Oilgear Variable Displacement Pump (P) driven by Differential (B) through Speed Increaser (F). Fluid Power from Pump (P) drives an Oilgear Constant Displacement Motor (M) to decrease speed of Section Drive Shaft (D). Oilgear Variable Displacement Motor (M) to decrease speed of Section Drive Shaft (D). Oilgear Variable Displacement Motor (A) to decrease (T) driven by Differential (B), and controlled remately by electric Pilot Motor (C) delivers controlled law-pressure fluid to Oilgear Constant Displacement Slave Tach-ometer (S)—directly connected to Motor (M). Fluid in branch line from tachameter system operates hydraulic control on Pump (P). Operator can infinitely decrease pm of Section Drive Shaft (D) up to 12% under lineshaft rpm—over entire 10:1 lineshaft range—by local or remote pushbutton stations connected to Pilot Motor (C) on Moster Tachameter (T). Changing valume and/or direction of fluid flow from Pump (P) to Motor (M). When main lineshaft rpm is increased or decreased, HYTAC* System automatically, precisely synchronizes Driveshaft (D) rpm. All factors such as changes in load or temperature are automatically compensated for by these HYTAC* Systems to maintain exact, set degree of section synchronization at all fimes.

These Oilgear-Beloit Systems enable operators to equalize draw between sections, to increase draw or slack at specific sections, and to prevent overload on one or more sections.

They have met or exceeded all originally specified requirements. In this age of special, single-purpose machines, this new paper machine is unique in its versatility—being fully capable of long runs, it is, however, particularly adapted and used for short runs — competitively producing the many different types, weights, and finishes of stock. • . . . In addition, an 800-ton Washington Iron Works pulp baling press, and a MURCO Wood Splitter in this mill are also equipped with Oilgear Application-Engineered Fluid Power Systems.

For similar practical solutions to YOUR linear or rotary Controlled Motion problems, call the factory-trained Oilgear Application-Engineer in your vicinity. Or write, stating your specific requirements, directly to . . .

THE OILGEAR COMPANY

Application-Engineered Controlled Motion Systems

1592 WEST PIERCE STREET . MILWAUKEE 4, WISCONSIN

Phone: Mitchell 5-6715 ... Direct Distance Digling Code 414

MONTHLY REPORT - WORLD NEWS

NORTH AMERICA'S PASSING PARADE . . . Downing Box Co., Milwaukee subsidiary of Longview Fibre Co., plans \$2,000,000 corrugated box plant in Minneapolis-St. Paul area. . . Columbia Cellulose Co. Ltd. builds research facilities adjacent to Prince Rupert, B.C. pulp mill; two-story structure to cover 13,940 sq. ft. . . . Dennison Mfg. Co. breaks ground at Framingham, Mass., for two-story building expanding product, service divisions, as well as providing more space for research. . . . Directors of Prairie Fibreboard Ltd., Saskatoon, Sask., decide to discontinue operations, sell assets; reason: grave financial situation for the producer of wallboard from straw. . . . St. Regis Paper Co. completes year's seventh acquisition, purchase of Federal Container Corp., Minneapolis producer of corrugated boxes. . . .

THE PARADE CONTINUES . . . Sonoco Products Co. acquires Dixie Paper Tube Co., Richmond, Va. firm producing tubes for Reynolds aluminum foil. . . . Flintkote Co., subject to bond issue okay, will build Magnolia, Miss. plant producing corrugated containers. . . Allied Paper Corp.'s Business Forms div. acquires Charles E. Brown Printing Co., Kansas City, Mo. . . . Deferiet, N. Y. mill of St. Regis Paper Co. sets milestone in its history as it passes 1,000,000 man-hours without disabling injury. . . . American Can Co. to build 145,000-sq. ft. plant in Chambersburg, Pa., to produce diverse range of plain and printed paperboard food packaging. . . .

IMPORTS, EXPORTS UP . . . during first nine months paper and board imports showed moderate gain over 1959. Exports, however, were up sharply. . . . Domestic Consumption was 29,300,000 tons (for an annual rate of 39,000,000), a 3% gain. . . . 1960 Expenditures for new plant and equipment estimated at \$740,000,000 compared to \$630,000,000 in 1959, \$578,000,000 in 1958. One result: 3% gain in output per man-hour.

PULP-PAPER, LUMBER: JOB SWITCH . . . lumber moves into pulp and paper as latter moves into lumber, says Robert V. Hansberger, president, Boise Cascade Corp. "Lumber companies used to burn up chips and waste wood, but nobody can afford that anymore. . . To offset falling lumber prices, we've installed 150-ton pulp mill, 375 tons scheduled for next year. . . . In the South pulp and paper firms, on the other hand, are backing into lumber. They can't afford to make all their timber into chips but have to sell lumber, too."

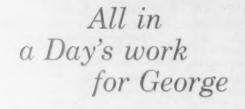
GREATER FUTURE DEMAND . . . for convenience packages saving time and effort foreseen by Roy J. Sund, president, American Can Co. 60's will be decade of growth. Not only will package of future be easier to open and close, it will be easier to handle and store; much lighter in weight, it will have more built-in "sell." Research is the key. Per capita use should rise above 20% by 1970.

PAPER GOES TO THE HOSPITAL . . . says Dixie Cup div., American Can Co. Modern hospitals using single-use paper items as fast as produced. Reasons obvious—sanitation, used once and destroyed; save time, labor; no washing, sterilizing; always available, with no waiting for supplies; risk of cross-infection reduced to minimum.

3,100 NEW JOBS SINCE WORLD WAR II . . . created by expansion of Minnesota's pulp and paper industry. Continuing expansions and modernizations made this possible. In last two years alone more than \$33,700,000 has been invested. New high of 8,700 jobs (1959) meant payroll of \$54,060,000. Paper and board production: more than 882,000 tons.

*WHEN DIFFERENCES BETWEEN COMPETING PRODUCTS DIMINISH . . . the distinctive-ness of their packages becomes increasingly important for the products' survival in the marketplace. *—Carl Blumenschein, Container Corp. of America.

Serving customers who buy NH3 and Nitrogen Solutions...



George Day, that is. George is the man customers have come to depend upon for these reasons: (1) George is from Standard Oil, a supplier with 70 years' experience making products that meet specifications and delivering these products to customers on time. (2) The Standard Oil Anhydrous Ammonia and Nitrogen Solutions which George sells are produced in one of the industry's most modern plants located in one of the best railway and highway shipping centers in the U.S. (3) One of the Midwest's largest quality control laboratories insures the high quality and "on spec." character of these products.

Customers also know George can be depended upon to look after their needs. Twenty-three years' experience serving customers for Standard Oil has taught him how to give these customers the kind of service that means profits for them.

Would you like help from George Day? Call him at Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.

You expect more from STANDARD



and you get it!

MONTHLY REPORT - WORLD NEWS

LARGEST MACHINERY EXPORT TO RUSSIA . . . will result if Japan-U. S. S. R. negotiations are successful. Contract calls for Nippon-manufactured paper mill equipment valued at some \$27,777,778.

MORE SELF-SERVICE STORES, MORE PAPER . . . in Sweden these outlets now total nearly 5,000, up some 6% from 1958. Packaged goods (frozen and fresh) are becoming big items abroad, as in the U. S.

LOAN TO FINNISH MILL . . . granted by International Finance Corp. Some \$1,875,-000 is being invested in Rauma Repola OY to aid in expansion and modernization of diversified manufacturing operations. Cellulose pulp mill to be increased from 70,000 to 150,000 tons yearly.

JUMP OF 30.4% . . . is recorded by total world sales of U. S. sulfite and sulfate paper grade pulp in first seven months. Europe purchased 78% of increased tonnage. European boom continues as focal point in world market pulp demand-supply picture. Sales through July were 1,039,-015 tons, up 242,188 from year ago.

INVERFORM WET END . . . to be installed next year on Petrie, Queensland machine of Australian Paper Manufacturers Ltd. Firm is spending £1,500,000 on plant that recently expanded by installing 38 new cylinders and horizontal size press.

SECOND HIGH-SPEED NEWSPRINT MACHINE . . . to be installed by Cartiere del Timavo SuA, Italian firm with mill at Trieste. Builder: Valmet Oy, Finland. Wire width is to be 5,800 mm, design speed 750 meters per min. and annual capacity 70,000 tons.

<u>UNITED KINGDOM: HALF-YEAR SHOWS GAIN</u>
... over same 1959 period. Production of all types paper and board was up just over 10% to 2,061,771 tons. Not one grade showed a decrease.

AMONG WORLD'S 50 LARGEST FIRMS . . . producing paper and board U. S. ranks high on the list with 26 entries. Canada

boasts 10, with a good sprinkling from Scandinavia and Europe. One Japanese firm qualifies to represent Asia. (See story and statistics this issue.)

GREECE, SOUTHERN RHODESIA EXPANSIONS
. . . reported by Bertrams Ltd., Edinburgh, Scot. paper mill engineers. Orders, both for complete units, amount to
£800,000.

DOUBLE CAPACITY IN THREE YEARS . . . is aim of recently-undertaken Kr160,000,000 expansion program at Fiskeby AB near Norrköping, central Sweden. Paper and board output will be 200,000 tons per year, that of pulp 185,000. New machine, to be built by Beloit Iron Works (U.S.A.), will be widest in Europe producing kraft, with trimmed width of 254 in. (645 cm). Capacity: 250 tons per day. Investment is largest ever made in one project by Swedish paper industry.

ANOTHER RECORD HIGH MARKED UP . . . by North American newsprint in first eight months. Output at 5,797,862 tons, 6% above same 1959 period. U. S., Canadian mills attained historical highs: 1,359,-241 and 4,438,621 tons, respectively.

FIRST PAPER FROM MISSOULA . . . where Waldorf-Hoerner Paper Products Co. is shipping five kraft weights to Hoerner Boxes Inc. corrugating plants. (See PULP & PAPER, March 1960, page 82.)

EARLY 1961 OPERATION SET . . . for new .009 fluting mill of Tampella Oy, Heinola, Finland. Complex consists of five buildings: barking plant; chemical plant; main building housing pulp mill and machine room; boiler house and steam power station, and chemical storage. Pandia digester to be used in production of NSSC pulp. Fourdinier built by Tampella. Sivola process used in recovery of cooking chemicals.

BIG RAILROAD CUSTOMER . . . forest products last year accounted for \$1.3 billion —or 15%—of total rail freight revenue.

GEORGIA-PACIFIC PAPER COMPANY

PORTLAND 4, OREGO

ROBERT E. FLOWERREE, JR.

July 15, 1960

Mr. F. T. Peterson, President The Black-Clawson Company 250 Park Avenue New York 17, New York

Dear Frank

I sm sure you know we started up our new Black-Clawson paper machine on June 15. I want to take this opportunity to tell you how pleased we are with the services that you have given us in the delivery of this equipment and also how pleased our people are with the machine itself.

It is very satisfying to have a job come out as well as our expansion program did and your company certainly played a large part in this achievement.

With my kindest personal regards.

Sincerely,

Bob

"0+5"

GEORGIA-PACIFIC

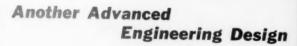
Eleven and a half months from date of order this 175" Black-Clawson paper machine was started up. A saleable sheet was on the reel in just 5 minutes

started up. A saleable sheet was on the reel in just 5 minutes.

A tribute to the fine organization of Georgia-Pacific Paper Company and another example of Black-Clawson's engineering and manufacturing service to the paper industry.









BLACK-CLAWSON

WORLD PULP & PAPER

Technical News

Beater Performance—Norway

ARLOV, A. P. Beater performance as studied by means of fiber fractionation experiments. Norsk Skogind, 13, no. 12; 474-81 (Dec. 1959). [Engl.; Norw. sum.] cf. A.B.I. P.C. 29: 1274.

An unbleached sulfite pulp was beaten in a P.F.I. laboratory mill and in two industrial beaters, of which one was equipped with metal bars and the other with beating surfaces made of basalt laval. Handsheets were made from the whole pulp and from individual fractions obtained in a Bauer-McNett Fiber Classifier. The strength increase obtained in the P.F.I. mill was twice that obtained in the basalt beater (comparing pulps beaten to the same wetness and fiber-length distribution). This is attributed largely to the greater strength of the long-fibered fractions obtained in the P.F.I. mill. The load-elongation properties of sheets from P.F.I. mill fractions displayed a pronounced fiber-length effect, whereas the sheets from the corresponding basalt-lava beater did not. This difference is believed to stem from a difference in sheet structure, the basalt-beaten sheets having a less uniform bond distribution. The P.F.I. mill is thought to yield internally fibrillated, smooth, and pliable fibers having a relatively low flocculating tendency and thus being well suited for uniform bond formation during drying. In the basalt-lava beater, the fibers are more or less crushed, resulting in reduced fiber strength and yielding a structurally heterogeneous sheet in which bonds are clustered, rather than evenly distributed. 5 ref.

Sugar Cane Bagasse—India

FAHMY, YEHIA A., and ASHMAWY, EMAD EL. Pulp and paper from sugar cane bagasse. India Pulp and Paper 14, no. 3: 161-7 (Sept., 1959).

Bagasse was pulped by kraft and single- and two-stage processes, and the effect of pulping variables (i.e., amount of chemicals used, time, and temperature) were investigated regarding their influence on delignification, resin and ash removal, pulp a-cellulose content, D.P., chlorine requirement, and strength. The influence of removal of increasing amounts of fines and short fibers on chemical and mechanical characteristics of kraft pulps was also studied. The data derived are presented. In particular, the effect of depithing on pulp properties was studied. The bagasse was first cleaned to remove dust and dirt contaminating the pith, and a portion of the bagasse was depithed in the dry state. Another portion was depithed between stages of the two-stage soda process. A comparison of the properties of pulps from undepithed, dry depithed and wet depithed bagasse fractions revealed no significant difference in strength and other mechanical and chemical properties. It is suggested that the dirt and dust, rather than the pith, are responsible for the strength reduction commonly associated with pulp from undepithed bagasse. 18 ref.

Sizing Degree—Rumania

Simionescu, Cristofor, and Poppel, Emanuel. Methods for determining the sizing degree of paper. Bul. inst. politeh. Iasi [N.S.] 4(8), no. 1-2:227-36 + 1 insert (1958). [Rum.; Russ. and Ger. sum.]

Three methods for testing the degree of sizing of papers are critically compared, viz., the linear ink test, the Jayme method, and the electric (K.B.B.) size test. The principle and practice of the last named method are discussed in

detail. The electric method makes it possible to differentiate two phenomena—the penetration of liquids into the paper capillaries and into the intermicellar regions. Capillary penetration indicates the degree of hydrophobicity of sized papers and can be characterized by the slope of the curves obtained when the increase in electric current is plotted against the square root of time. The results obtained led to a modification of the K.B.B. size test. 13 ref.

Alginates in Paper—England

ALGINATE INDUSTRIES LTD. Allgem. Papier-Rundschau, no. 5:232-3 (March 5, 1960). [Ger.] Abstr. Bull. I. P. C. 30:1280.

The preparation, properties and applications of soluble and insoluble alginate films and coatings are outlined briefly, including anti-sticking (anti-adhesive) coatings, alginate films containing PVA, starch-containing coatings and corrugating adhesives, alginate binders for kaolin coatings.

Dirt Removal—Australia

IRWIN, K. G. The incidence of dirt in paper and its removal at Associated Pulp and Paper Mills, Ltd., Burnie. Appita 13, no. 3: 104-10 discn.: 110-11 (Nov. 1959).

A four-stage system of cyclone pulp cleaners installed at the beginning of 1958 is described. The cleaners are placed immediately before the paper machine and are used to remove dirt particles from all components of the furnish. Excellent results for dirt removal are obtained with a low fiber loss of 1%. Loss of usable filler clay in the form of flocculated fines averages 3% of the clay added to the furnish. 2 ref.

Moisture and Wax-Finland

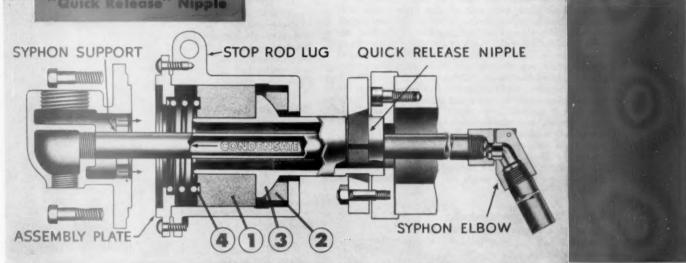
LIRRI, OSMO. Paperi ja Puu 42, no. 2:43-5, 48-50, 52-6 (Feb. 1960). [Finn.; Engl. sum.] Abstr. Bull. I. P. C. 30:1314.

Particle board (I), being composed of ca. 90% wood, is hygroscopic like wood but, because of its sheet structure. is affected unlike wood by moisture, I shows max, strength at 8-9% moisture content, corresponding to 60-65% R.H. at 20°C. At very high R.H., the strength can decrease to one half of the maximum. During soaking in water, the strength decreases rapidly and considerably, even if I contains wax. Wax retards water absorption and swelling of I soaked in water, especially in short-term tests. Because wax is much more effective in controlling the results of soaking tests than of humidification tests, its use in I is of questionable value. Wax does not affect the bending strength of I but decreases the tensile strength perpendicular to the board surface by 7-8%. The effects of wax additions are especially marked in the 0-5% range (based on dry resin weight). The results of water-soaking tests can vary the size and position of the specimen during soaking. Humidification tests are subject to fewer influences and are, therefore, more suitable than soaking methods for evaluating the hygroscopic properties of I.

Presented with permission of the Institute of Paper Chemistry, under supervision of Curtis L. Brown, editor of IPC Bulletin. Photostats or translations of original reports are available at reasonable cost by writing Institute of Paper Chemistry, PO Box 498, Appleton, Wis.



for Paper Machine Dryers with STATIONARY **Syphon Pipes**



Only 4 Internal Parts

This simplicity of construction means fewer breeding places for trouble. The SUPER construction—which features rock-hard "Green Streak" seal rings and special Ni-Chrome plating—reduces friction and wear importantly. The "Quick Release" Nipple makes mounting, or inspection, a one-man one-wrench operation. The Syphon Elbow ends all the troubles of the unwieldy curved syphon pipes—hinges to pass right through the joint.

Like all Type S Johnson Joints, the Type SBP is completely self-supporting—needs no external supports of any kind. All in all it is a good example of why Johnson Joints are first choice in the paper industry. Type S Johnson Joints are available in sizes from ¼" through 4", for both through-flow and stationary syphon pipe applications. This simplicity of construction means fewer breed-

and stationary syphon pipe applications.

FREE TRIAL—We'll gladly furnish a pair of Johnson Joints for 90-day trial in your own mill. Write for information.

GUIDE Makes the joint self-supporting. It is of self-lubricating long-wearing carbon-graphite. SEAL RING_Also of carbon-graphife. Eliminates all packing and requires no lubrication. NIPPLE_Rotates with the roll, and seals against the ring. SPRING-Serves for initial reating only. In operation joint is pressure-sealed.



HN50N CORPORATION

849 WOOD STREET . THREE RIVERS, MICHIGAN

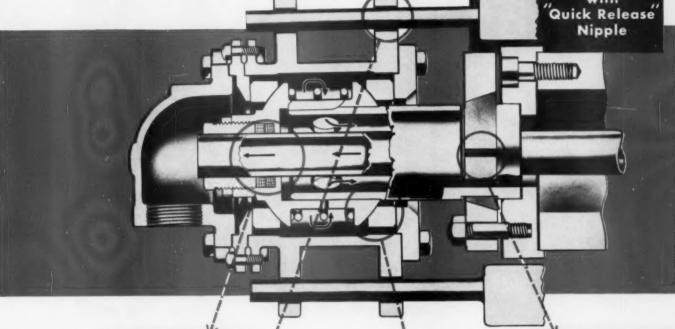
Pressure Joints . Direct Operated Salenoid Valves

• • • and for Paper Machine Dryers with <u>ROTATING</u> Syphon Pipes

Johnson
Joint

With

"Quick Release



Best Design Yet

Rotating syphon pipe does not rotate in the packing; thrust collar, nipple, packing gland and syphon pipe all rotate together as a unit. Joint needs no lubrication or adjustment. Time-proved construction had only a few simple parts—a design which thwarts trouble, permits easier field servicing. Assembly plate provides ready access to syphon pipe. Type L-N Johnson Joints are available in sizes from ½" through 8".

Floating Action

Simple rod supports carry all the weight of the body and connections—permit the rotating assembly to "float" freely inside. Can be adapted for machines with open or enclosed gearing.

Easy On . . . and Off

ohnson "Quick Release" Nipple utilizes powerful wedging action to lock nipple securely to journal. You install the joint or remove it for inspection—with just an end wrench; no danger of damaging nipple with heavy pipe wrenches.

Super Construction . . . and Stamina

Teams "Green Streak" seal rings, of much harder and denser structure, with Ni-Chrome plating on wearing surfaces. Results: Considerable reduction in friction load and much longer service life.

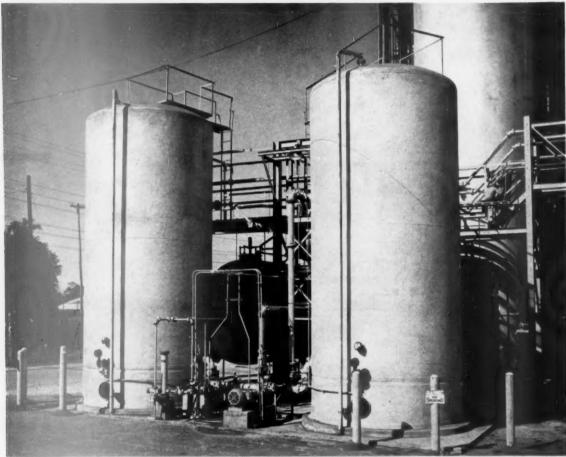
Write for Literature

Bulletin S-Johnson Joints for use with both through-flow and stationary syphon pipe

Bulletin N-Johnson Joints for use with rotat



FLUIDICS* AT WORK



Glasteel takes the bite out of corrosive chlorine dioxide at Scott Paper Company's mill in Mobile, Alabama.

How to profitably end corrosion in every phase of ClO₂ generation

If you examined these tanks for dissolving and storing sodium chlorate, you'd find no evidence of corrosion at the constantly shifting liquid-air interface.

The reason? These are Pfaudler Glasteel tanks—steel outside for strength, glass inside for corrosion resistance. And there is no rust contamination of the chlorate, which can cause troublesome "puffs."

These tanks plus towers, pumps and ClO₂ storage tanks are part of the chlorine dioxide system at Scott Paper Company in Mobile, Alabama. In operation for some 15 months now, there has been no evidence of corrosive attack in any

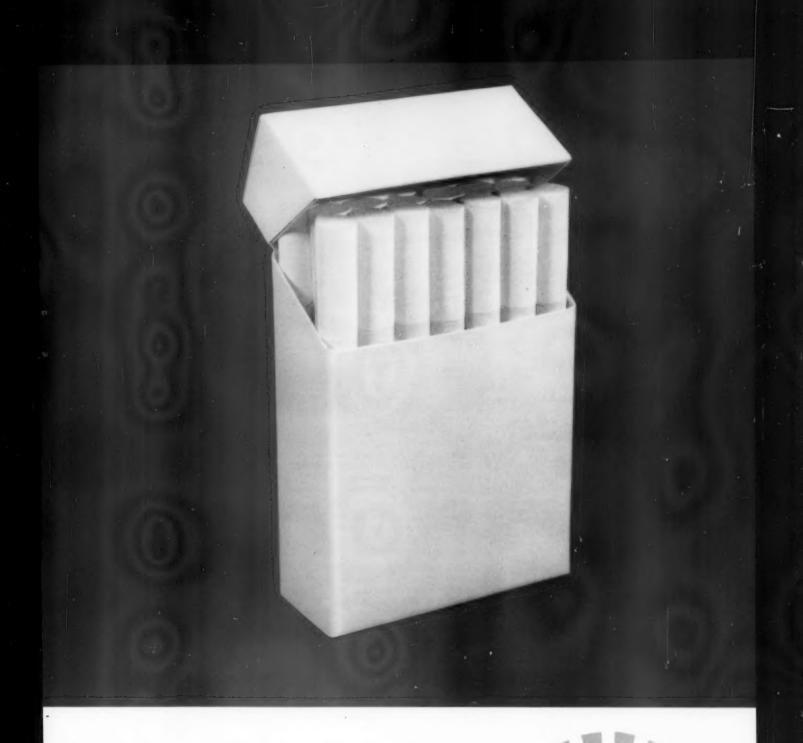
part of the system where Glasteel has been used.

You will also find Glasteel equipment in 38 other progressive pulp mills. And, whether the Solvay or Olin Mathieson process is used, the reports are still the same: Pfaudler Glasteel turns out to be the most *economical* equipment available, in terms of cost, maintenance and service life.

With this experience and our Project Engineering service, Pfaudler offers you or your engineering firm complete plant design, procurement and installation for ClO_2 generating systems. For more information, write to our Pfaudler Division, Dept. PP-110, Rochester 3, N. Y.



*FLUIDICS is the Pfaudler Permutit program that integrates knowledge, equipment and experience in solving problems involving fluids.



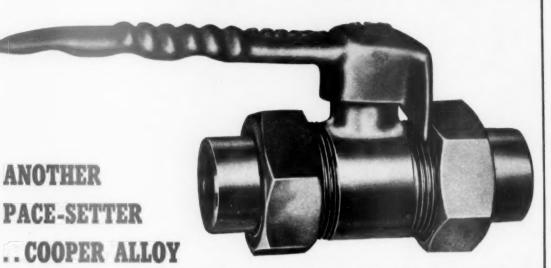
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BALL VALVE

with

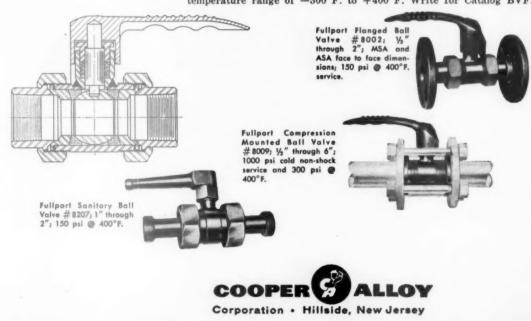
UNION ENDS

Cooper Alloy Ball Valve #8001 with interchangeable union ends is the most versatile ball valve available. Ends are interchangeable with screwed, socket-weld, butt-weld, flanged Victaulic and special connections without need for complicated adjustments.

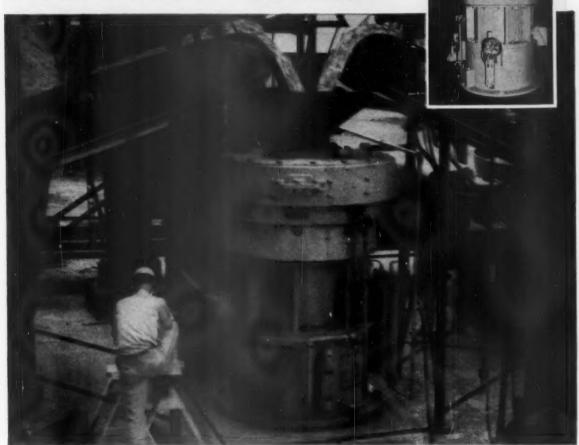
Like all Cooper Alloy Ball Valves, #8001 handles practically every corrosive and slurry in the most difficult of chemical and petro-chemical operations. This valve aligns automatically with piping, rotates 360° to any position without adjustments; comes apart and goes together again in a few minutes if servicing is needed.

As with all Cooper Alloy Ball Valves, this valve has the pace-setting features which include "Fullport" straight-through-no-turbulence flow in either direction; adjusting shims, extra deep stuffing box; broad teflon seats that eliminate need for "O" rings and positive slotted key drive in the ball that eliminates ball wobble and wear.

Available in stainless steel; sizes $\frac{1}{2}$ " through 2"; tested to 1000 psi in temperature range of -300°F. to +400°F. Write for Catalog BVF.



For primary refining at low power... New Jones Vertiflex



Vertifiex requires minimum floor space. Available in two disc sizes — 48" (shown here) and 34".

Typical application.... Chip Shredding

High quality pulp with extremely low waste and fibre damage, substantial savings in alkali used, increased yield, decreased screen rejects and lower recovery system loading — those are the results from this efficient Jones Vertiflex chip shredding installation. And energy required to process more than 2000 B.D. tons per day is just over ½ HP days per ton!

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Other applications on which the Jones Vertiflex will perform with outstanding efficiency include cold caustic chips, high yield pulps, bagasse, high density bleaching and denoodling. For full details write to E. D. Jones Corporation, Pittsfield, Mass.



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Teeth in vertically mounted rotating disc inter-mesh with teeth in opposing stationary plate mounted in Vertiflex cover. Clearance is easily adjustable and disc life is high since there is never any metaltor-metal contact. Teeth shape and arrangements are varied to fit the application.



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Paper makers have always known that Northeastern Spruce has unexcelled paper making properties. Now, with WONDERWHITE, you have the forming and printing qualities available only in a spruce sulphite, plus the high brightness which only Chlorine Dioxide can give.

Maybe this pulp is the answer to a number of your problems. May we suggest a trial shipment? You'll soon see why we called it WONDERWHITE.

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CAMERON IMPERIAL, world's fastest winder for newsprint, paper and paperboard. Speeds in excess of 8000 fpm*. Maximum rewind capacities 42", 72" or 84". Widths to suit requirements.

*All speeds are dependent upon machine width, number of cuts, tension, and characteristics of material.

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We call it The New Roll because it is fundamentally different from any paper roll you ever shipped from your mills and finishing rooms.

Printers and converters who have used *The New Roll* in actual production ask: How can it run so fast without web breaks? Why does *The New Roll* feed out so smoothly right down to the core? How does *The New Roll* keep paper so "live" for better end results, rather than stretched out "dead" in the roll?

The answer is in the way The New

Roll is made. It can be produced only on a truly integrated Cameron roll winding system, job-fitted by Cameron specialists to assure optimum roll control all the way from unwind to rewind. The result is a finished roll of superb new quality.

If you want all the facts write today, or talk to your Cameron representative about visiting our research and development service in Dover, New Jersey, where pilot winding systems and action motion pictures tell the story of *The New Roll*.



CAMERON 480 and 470. Speed rated in excess of 7000 fpm*. Rewind capacities of 42", 60", 72" and 84". Widths to suit requirements.



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Winders for every mill



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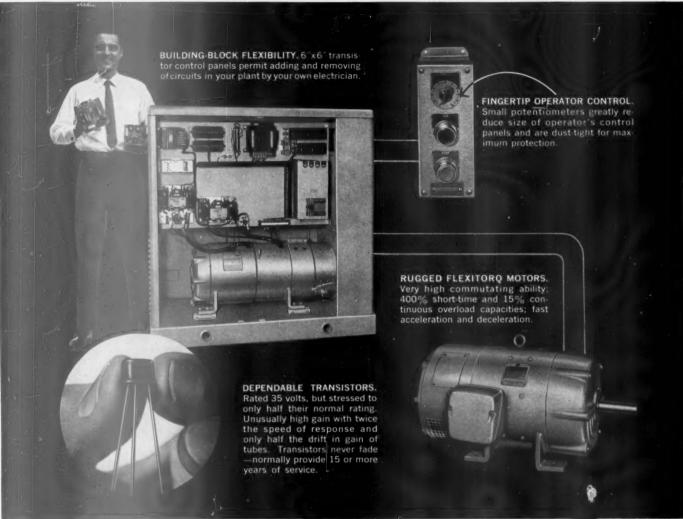


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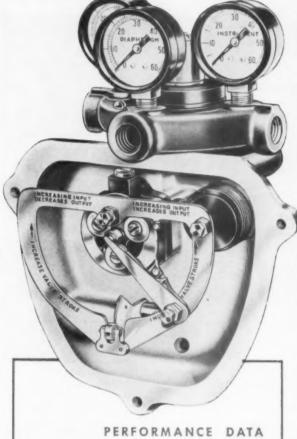
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Further savings are provided by the new Louis Allis Flexitorq® drive motors through vastly improved commutation, low brush wear, and their ability to safely withstand momentary overloads of 400% of normal horsepower rating.

Select-A-Spede sizes from 5 to 400 hp, speed ranges up to 20:1. Contact any one of the 60 Louis Allis District Offices for information and application assistance. Or write for bulletin 2001 to The Louis Allis Co., 444 E. Stewart Street, Milwaukee 1, Wisconsin.

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Hysteresis, (Average) 0.0012*

Linearity as required. Change

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Repeatability ±0.0003*

Stroking Speed 0.37 in/sec.

Air Consumption 10 acfin

Break Frequency (5% of instrument pressure range) 3.9 cps

nstrument pressure range) 4.6 cps

The above performance data was taken from laboratory tests on a Type 657 diaphragm actuator, Size 40, with $1\frac{1}{2}$ " travel. Instrument range 3 to 15 psi.

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Assured product performance through DYNAMIC ANALYSIS engineering

Application of mathematical techniques of design to pressure control systems has enabled Fisher to eliminate the conventional approach in the development of the new V/P valve positioner. It has provided the V/P with the following combination of characteristics and performance...unobtainable in any other type of valve positioner.

SMALL AND COMPACT ... only 6%" wide and 8%" high (with gauges).

CONVENIENT ADJUSTMENT ... valve stroke and zero adjustment readily accessible and easy to make.

SPLIT RANGE ... no parts change whatsoever is required for split range operation.

EASILY REVERSIBLE ... reversed by simply moving flapper arm from one beam quadrant to the opposite quadrant.

CHARACTERIZED CAMS ... offer wide flexibility in valve characteristics.

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New Ideas and Equipment for the Pulp and Paper Industry Soon To Be Announced

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YOU... increased pulp output, lower production costs

Ammonium Bisulfite Pulping is the key to increased profits for many mills. The process is easily adopted with a surprisingly small capital investment.

ABP offers a number of attractive advantages over the calcium-base

process: Shorter cooking time; 20% increase in digester output; greater yields; better penetration permitting a wider choice of woods.

Substantial savings are also possible through elimination of "liming up" problems. What's more, liquid

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Get in touch with Allied Chemical ... pioneer of this efficient process. We will gladly work with you to help put this profitable system into operation at your mill.

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For specifications and local offices, see our insert in Chemical Materials Catalog, pages 475-482 and in Chemical Week Buyers Guide, pages 37-44.

PULP & PAPER - November 1960

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COMPLETELY CORROSION RESISTANT

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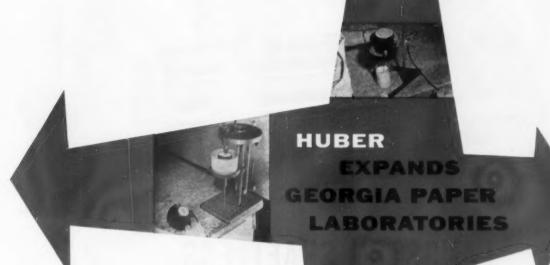
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3171-PH

26

November 1960 - PULP & PAPER



As it has from its inception, the Huber, Ga., laboratory maintains a close relationship with customers through our Technical Service department. As our Georgia operations—and service to our customers—have grown, our laboratory has been enlarged to provide ever better service.

The largest of the Huber Paper Laboratory expansions was recently completed.

The laboratory is equipped and manned to conduct the same kind of work that our customers perform in their own laboratories. We duplicate all of the essential stages of paper making from sheet to finished filled or coated paper.

If you would like to learn how the Huber Paper Laboratories can improve your product, we will be glad to sit down and discuss it with you.

J. M. HUBER CORPORATION

630 THIRD AVENUE • NEW YORK 17, N. Y. Mines and Plants: Huber, Ga.; Graniteville & Langley, S. C.



Boost your production... reduce your slitting and rewinding costs



Easy, fast, completely safe. One man does everything. Operating pushbutton controls, he closes lifting arms, elevates roll, sets brakes.

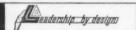
One man can load the heaviest roll. No heavy shaft to handle. No cone tightening. No couplings to engage. No crane lifting. Just pushbuttons. This is the Langston standard shaftless unwind stand for rewinding and converting applications.

You not only save time, you also get better unwinding. Roll can be positioned laterally by pushbutton control—even when the machine is running. It's held firmly under pressure for complete safety throughout the unwind. Several braking arrangements can be provided to handle a wide range of grades and conditions. Available extras provide for handling very narrow rolls; for constant tensioning; for automatic braking of idler rolls; for automatic web alignment and side register control; for web oscillation; and for local or remote control.

This new Langston shaftless unwind stand can be used with any make of slitter. Available for maximum roll widths from 36 to 140 in. and diameters from 14 to 84 in. For complete information, write Samuel M. Langston Co., Camden 4, N. J.



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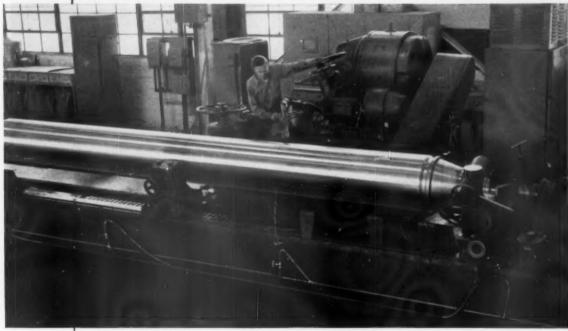


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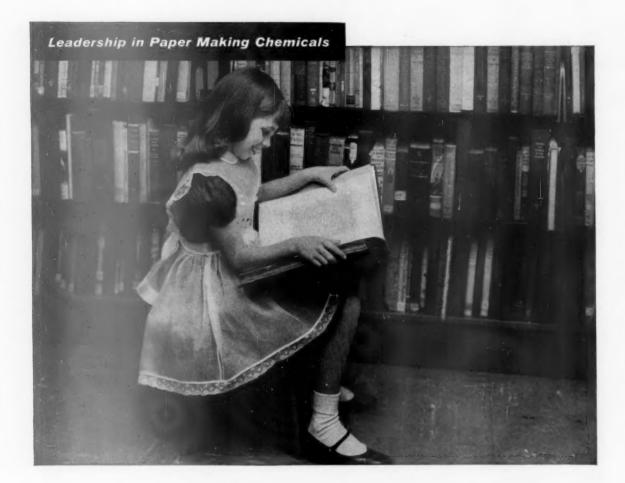
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Light weight United Micrometer Roll Caliper. Micrometer dial graduated in thousandths. The most accurate saddle-type caliper in use today.



WHEN SHE'S A GREAT-GRANDMOTHER THIS BOOK WILL BE "LIKE NEW"

Books like "Sleeping Beauty" have been bringing a smile to children's faces for generations. But the casualty rate is high . . . continual reading soon takes its toll and the book must be replaced.

Now there is a way to manufacture book paper that will last as long as 300 years under the conditions of everyday use. This paper was developed by the well-known restorer of documents, W. J. Barrow, under a grant to the Virginia State Library by the Ford Foundation's Council on Library Resources.

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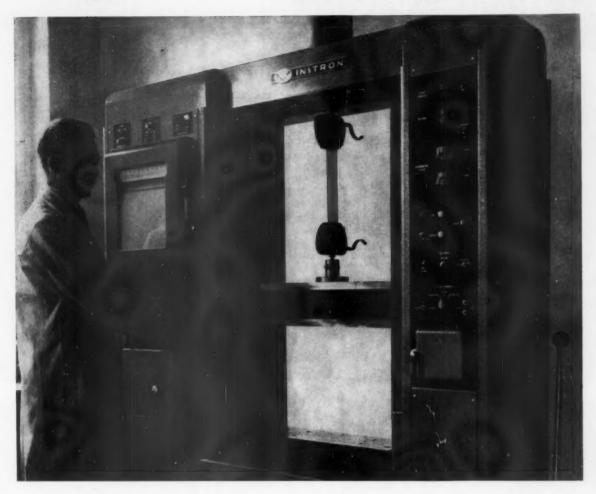
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5

SCAPA Research Sets the Pace!



Scapa's Instron Machine is not used exclusively for the routine testing of fibers, yarns and felts. It plays an important part in Scapa's never-ending Research activity.

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NEW ST. FRANCISVILLE MILL USES RELIANCE HELPER

Extensive use of helper drives, properly applied to the Fourdrinier, press and coater sections of this line shaft-driven 264" Beloit machine, evenly proportions the total use of power, relieving harmful stress on felts and wire. The key is in the balancing—the precise regulation—of helper drive torque against mechanical torque. Continuous maintenance of this relationship at 2500 feet per minute, is vital if maximum wire and felt life is to be realized.

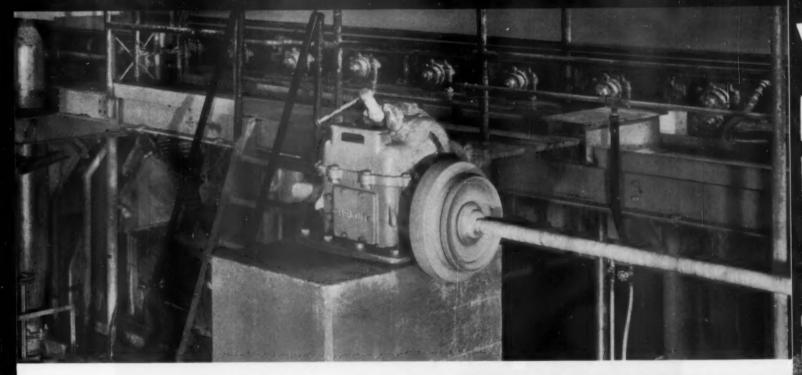
The helper motors are powered by line shaft driven generators. VSMR mill-type regulators continuously maintain preset relationship of total electrical to total mechanical power input, regardless of changing load demands. The end result is smooth, fast, coordinated machine performance, which produces uniform quality magazine stock. Helper drives regulated in this manner also have smooth acceleration characteristics, relieving the mechanical equipment of excessive accelerating loads.



Two Reliance driven Appleton supercalenders handle the output of the paper machine. Motors are synchronized to keep paper flowing smoothly at top speeds of 2500 fpm. Accurate drive regulation maintains exact, pre-set speeds... and uniform tension. The same precise tension is maintained during acceleration and deceleration of the drive system.

DRIVES TO PROLONG WIRE AND FELT LIFE

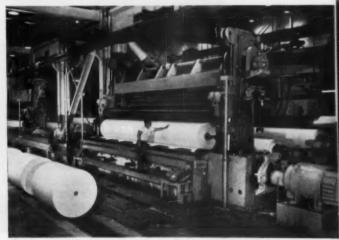
DRIVES TO PROLONG WIRE AND FELT LIFE ...



The Cameron winders, also Reliance driven and controlled, complete the production operation. The 250" rolls are rewound and slit for shipment at 5000 fpm. VSR regulators accurately hold winding speeds and also smoothly change the drive to thread speeds for passing splices.

Reliance systems engineering gives you what you want, when and where you want it.

Your Reliance Sales Engineer, who has all the facts, can help you plan and apply the type of engineered drive most suitable to your requirements. Call him, or if you prefer, write to us direct.



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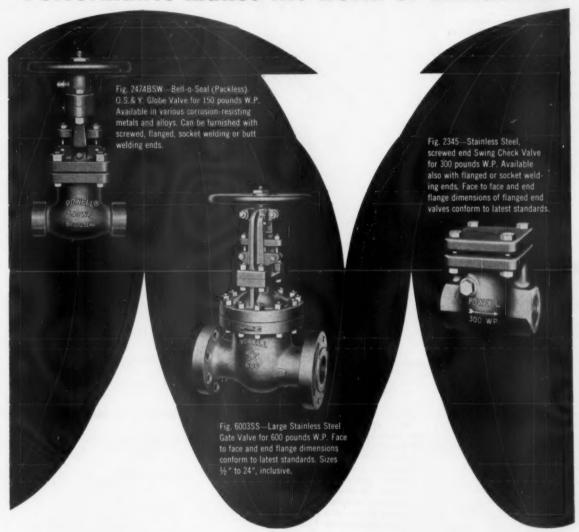
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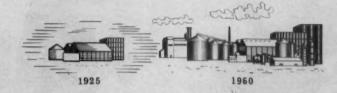
They are available in a wide selection of materials ranging from "A" to "Z" (Aluminum to Zirconium) to handle practically every known corrosive media. For complete details contact your nearby Powell Valve Distributor—or write directly to us.

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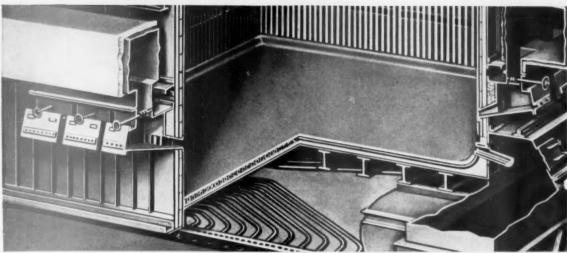
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ORGANIZATION

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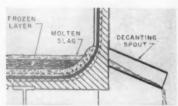
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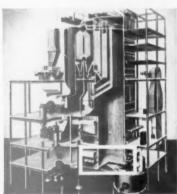


Cutaway view of the C-E hearth showing watercooled floor and decanting spout.

Watercooled Decanting Hearths Score 157 Maintenance-Free Years



Molten slag never touches furnace floor, preventing damage to hearth and contamination of slag by eroded refractory.



One of the latest C-E Chemical Recovery Units

an important part of the modern kraft pulp
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superheater can fall directly to hearth.

... in 50 C-E recovery units

Since the development of the watercooled decanting hearth by Combustion Engineering in 1951, 50 C-E Chemical Recovery Units have served an aggregate of 157 years completely free from hearth maintenance.

The decanting principle — key to this durability — employs a level, watercooled furnace floor. A layer of solidified slag, kept frozen by the watercooling, covers the floor. Molten slag resting on this hardened surface drains off (decants) through a spout located several inches above the frozen layer. Hearth refractory and floor tubes are never exposed to erosion by the hot liquid slag, hence rarely need repair.

The C-E Decanting Hearth eliminates a common cause of furnace shutdowns. Other C-E advances offer improved recovery unit control, flexibility and efficiency. And, because of the high availability experienced with modern C-E recovery units, pulp mills can now depend on one large-capacity unit in place of two smaller ones—with considerable savings in the cost of maintenance and operation. For interesting details, call the C-E office nearest you or contact the C-E Paper Mill Division in New York.

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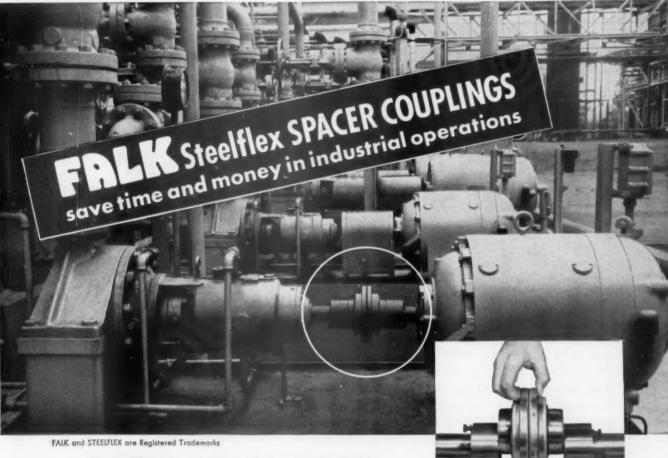
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The heart of the FALK Spacer ... the basic Type F Steelflex Write for Service Manual 4838



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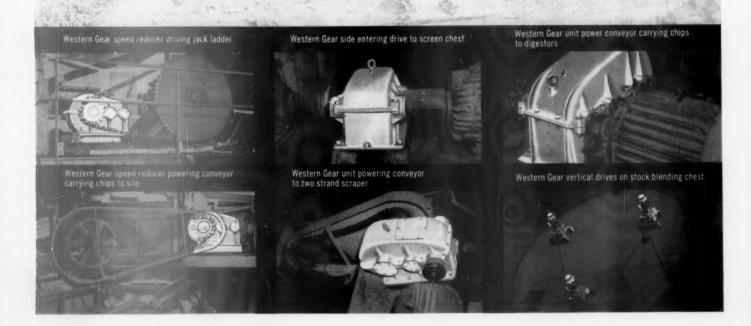
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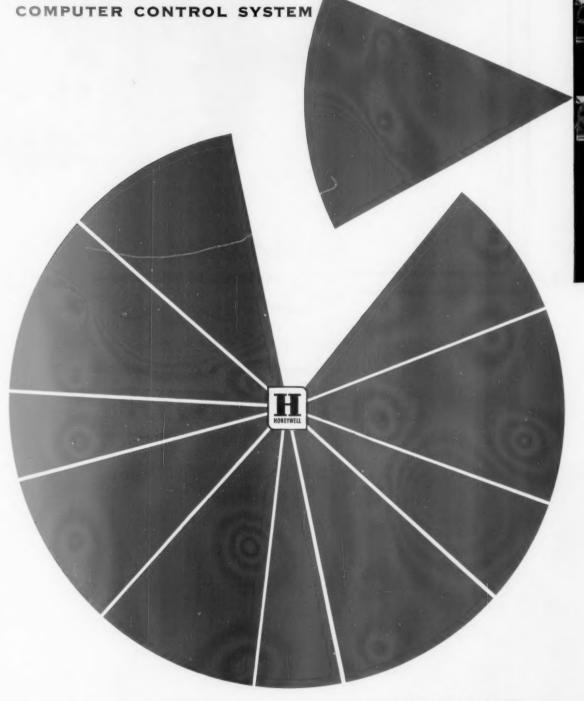
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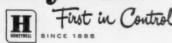
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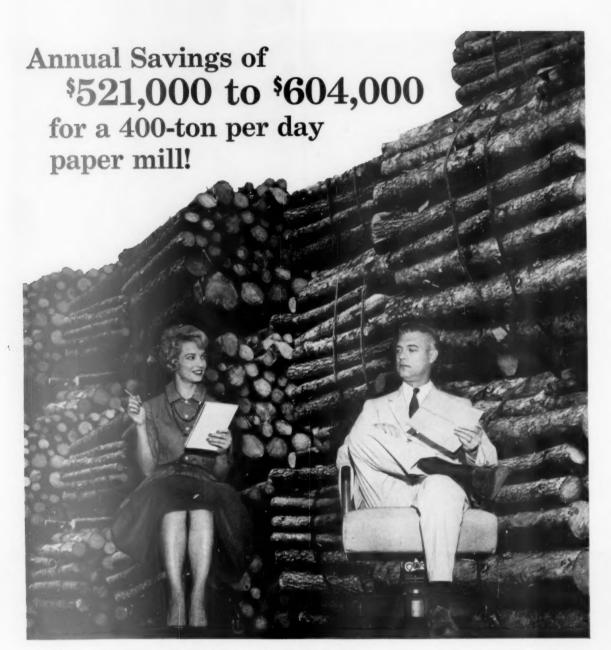
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It's a fact! Projected operating costs of a pulp paper mill on a site in N&W territory are far less than operating costs of mills now supplying this market. Actual savings are spelled out in an authoritative, recently-completed comparison made by Fantus Area Research, based on their years of plant location service. From it, you can see how transportation costs may be cut more than \$400,000—fuel, steam and power costs reduced as much as \$200,000.

Other phases of the report analyze markets, labor, raw materials, taxes, industry trends — every factor pertinent to locating a mill at these profitable sites. Make sure your company is the one that capitalizes on this major competitive advantage. Write on company letterhead to H. P. Cotton, Assistant Vice President, Norfolk and Western Railway, Roanoke, Virginia.

MANY OTHER TYPES OF INDUSTRY can slash operating costs with plants in N&W territory. Fantus proves it in dollars and cents.

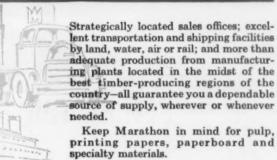




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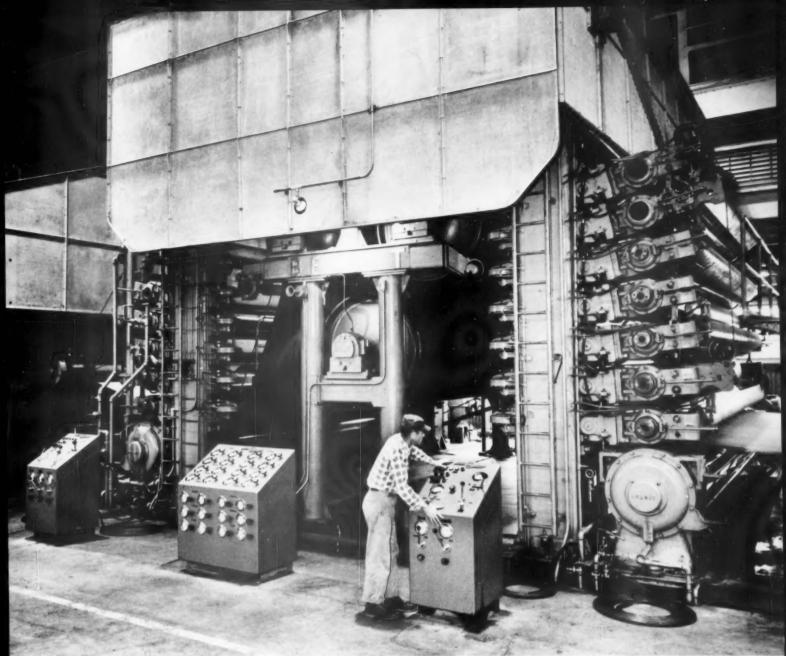
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HOOKER CHEMICAL CORPORATION

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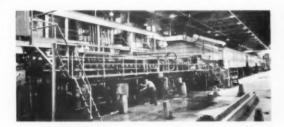
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In Canada: Hooker Chemicals Limited, North Vancouver, B.C.



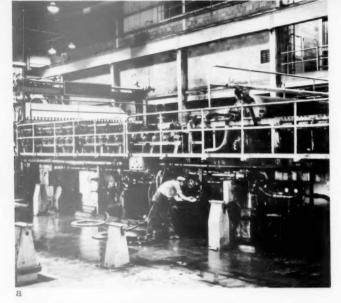


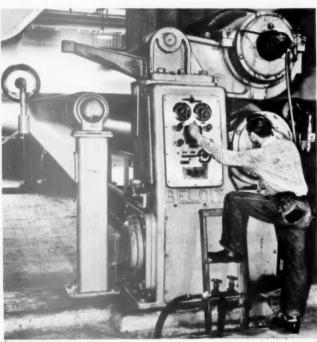
Twin Open Side Calender Stack, No. 4 Machine. Roanoke Rapids, North Carolina

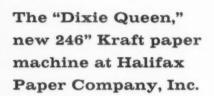
alifax Paper Company, Inc. A Division of Albemarle Paper Mfg. Co.



New 246" Kraft paper machine at Halifax Paper Company, Inc. has boosted the mill's total daily production of Kraft paper to over 600 tons per day. The new No. 4 machine - the "Dixie Queen" - operates next to the "Southern Star," a sister 246" Beloit machine installed in 1953. For further details, please turn the page.

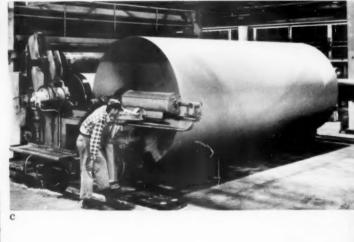


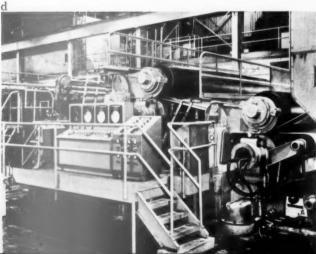




The "Dixie Queen" was running at speeds up to 1200 fpm within 72 hours and salable paper was produced six hours after start-up. The Fourdrinier and dryer sections are arranged to permit future expansion of productive capacity.

(a) 246" Beloit removable Fourdrinier and Type E air-cushioned inlet. (b) Breaker stack equipped with air-operated nip pressure control. (c) Beloit heavy-duty Kraft-type pneumatic reel. (d) Straight-through suction press with open couch draw.







your partner in papermaking



Skilled foresters at Weyerhaeuser tree farms will give expert care to this and millions of other young trees to insure an ever-increasing and continuous supply of wood pulp.



BY THE CYLINDER

BY THE BARGE



DIAMOND SHIPS LIQUID CHLORINE THE WAY YOU CAN USE IT BEST

If you're a big user of liquid chlorine and are on or adjacent to an inland waterway—Diamond can make deliveries by barge at the lowest possible cost.

Or, if you want it in 100- or 150-pound lots, Diamond ships special cylinders in those quantities, too. In between, there's a comprehensive and economical choice of ton containers and tank cars in any quantity by rail or truck

Any way you get liquid chlorine from Diamond, you get maximum safeguards in handling, prompt service and the best of technical service. You'll be glad you're doing business with Diamond. Send for the Diamond "Chlorine Handbook." Write Diamond Alkali Company, 300 Union Commerce Building, Cleveland 14, Ohio.



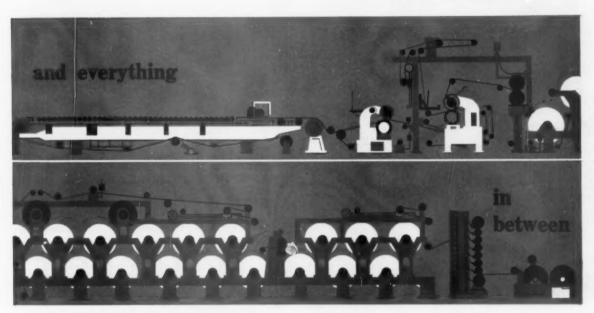
for complete machine room responsibility Manchester

from headbox



to winder





You can depend on Manchester for the kind of creative design that pays off in more efficient, more productive paper-making machines. With a skilled, experienced engineering staff . . . with modern manufacturing facilities, including a new 100,000 sq. ft. plant . . . Manchester builds advanced paper machines today that will compete profitably with tomorrow's machines-help keep you out front in the highly competitive years ahead.

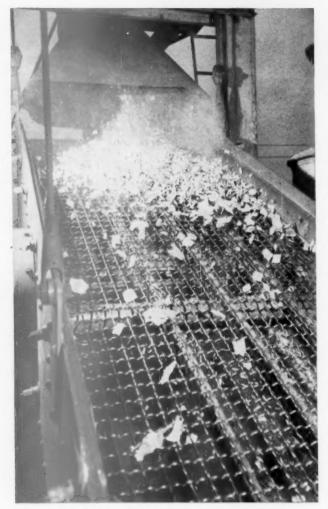
Considering expanding or modernizing your production facilities? Call in the Man from Manchester. He'll show you how Manchester has put practical ingenuity to work—improving quality, boosting production, cutting costs-for other papermakers. These same benefits are yours when you give Manchester complete machine room responsibility. Write: THE MANCHESTER MACHINE COMPANY, Middletown, Ohio.

Manchester...profit builders for papermakers



THE MANCHESTER MACHINE COMPANY

Positive way to separate the profitable part of your chips



LINK-BELT "CA" double-deck vibrating screen separating oversize chips, slivers and sawdust from wood chips. Note the full loading and rapid clearing of the top deck. This screen can handle up to 2000 cu. ft. of chips per hour.

Powerful LINK-BELT "CA" vibrating screens accurately sort slivers, sawdust and oversize pieces



The grease-lubricated, completely enclosed two-bearing vibrator, above, is the reason why Link-Belt "CA" screens provide fast, precise chip separation. Its smooth, Concentric Action imparts even, circular motion to every square inch of the screen decks . . assures lively tumbling of every particle. And its unbalanced weights are easily adjusted to the amplitude of highest efficiency.

Besides rapid, sure stratification, Link-Belt "CA" screens offer the economy of overall rugged construction. Frictionless, labyrinth seals protect self-aligning roller bearing from dirt and abrasive dust. Stress-relieved decks are riveted to heavy side plates to form rigid box assemblies.

For full details on "CA" vibrating screens, call your Link-Belt office. Or write for Book 2777.



VIBRATING SCREENS

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants and Sales Offices in All Principal Cities. Export Office, New York 7; Australia, Marrickville (Sydney): Brazil, Sao Paulo; Canada, Scarboro (Toronto 13): South Africa, Springs. Representatives Throughout the World.

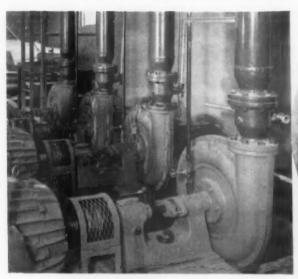
A size and type to handle every load . . . as fast as your chippers can deliver it 1-deck 2-deck 3-deck

amesbury



"Double-Seal"
BALL VALVES*

Most VERSATILE Valve In The Mill!

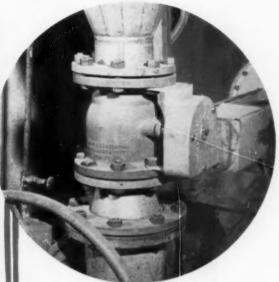


Jamesbury installation at Mead Corporation Chillicothe Plant

As varied as the valving requirements are in pulp and paper processing, the Jamesbury "Double-Seal" Ball Valve is meeting them successfully. Jamesbury offers a functional, efficient, economical Ball Valve which has proved itself in performance in many major installations such as the examples shown above.

Jamesbury Ball Valve Versatility Is Proving Itself In These and Other Services

Spent Acid Lines * Sodium Dioxide * Calcium Hypochlorite CO2 * Sampling Lines * Stock Lines * Bleach Lines * Liquor Lines H₂SO₄ * Black Liquor Recovery Service * Kraft Mill Digester Service * Chlorinated Stock Service * Brown Water SO₂ Service Instrumentation Lines * White Water * Water & Pulp Grinder Water in Filtration Plant * Digester Gas-Off * Digester Blow Service * Vacuum Service * Power Boiler * Gas Service General Caustic Service * Alum Lines * White Liquor Fill Vortrap Drain * General Air Service * Kaolin Clay Service * Paper Filler Service * Glue & Paste Service * Pilot Laboratory * Demineralizer Coating * Color Rooms * Paper Machine Showers * Hydrogen Gas Service * Boiler Water Treatment System * Ash Elimination Dry Chlorine Service * Starch System.

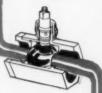


Jamesbury installation at Weyerhaeuser Longview Plant

GREATEST RANGE OF BALL VALVE SIZES AND MATERIALS AVAILABLE.

Jamesbury "Double-Seal" Ball Valves are available in Types 303, 316 and Alloy 20 Stainless Steels, Carbon Steel, Bronze, Ductile Iron, Aluminum and PVC. Other materials on special order.

Interchangeable seats and seals are available in "Teflon", Nylon, Buna-N, Neoprene, Hypalan and natural rubbers. Pneumatic, Hydraulic and Electric Motor Operators to fit Remote Control Requirements.



SIZES

Flanged

1/4" through 3"
1/2" through 10"
150# and 300# series

Send for Jamesbury's Pulp and Paper Brochure.

JAMESBURY

RY CORP. NEW STREET, WORCESTER, MASS.
Distributors in Principal Cities

227-0 *Patente

PULP & PAPER - November 1960

57

Bauer Pressafiner Aids in Chemical Recovery

By efficiently squeezing spent liquor out of treated chips at a high dissolved solids concentration, the Pressafiner minimizes evaporation requirements in the chemical recovery operation.

The Press is easy to install. Position and secure unit. Connect power. Hook up conveying equipment to handle feed and press cake, and pipe expressed liquor away. That's it!

Extra benefits, such as improved pulp characteristics and lower refining costs are generally experienced. Ask for details.

THE BAUER BROS. CO. Springfield, Ohio



No. 560 Pressafiner at Watervliet Paper Company, Watervliet, Michigan. Unit removes over 75% of fluids from cooked chips, according to mill spokesman.

PNEUMATIC MATERIALS CONVEYING BY

ALLEN-SHERMAN-HOFF

The positive pressure conveying system illustrated below is a page from our *new* Pneumatic Materials Handling Bulletin, PM-1. This is a system we engineered to deliver pellets from storage to a multitude of individual machine hoppers for continuous feeding into process.

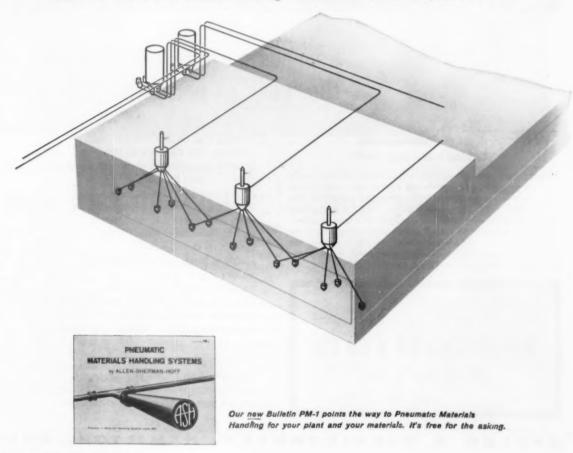
If you are interested in investigating the advantages of conveying materials by air, we would like to send you a copy of this *new* bulletin. It pictures systems we've engineered and points the way to help in solving many of the materials handling problems of your plant and your materials.

THE ALLEN-SHERMAN-HOFF COMPANY pioneered in the field of materials handling

systems—both pneumatic and hydraulic. Today we have systems in operation throughout the world, primarily in plants where reliability of performance is of paramount importance.

Discuss your materials handling problems with an A-S-H Representative—he's a pneumatic conveying expert. If there is any question about conveying your material, he'll arrange to have evaluation tests conducted by our Research Group. For his name and your copy of Bulletin PM-1, write, wire or phone . . .

THE ALLEN-SHERMAN-HOFF COMPANY, 247 East Lancaster Avenue, Wynnewood, Pa.



PULP & PAPER - November 1960



HAM FELTZ says:

"Reminds me of HAMILTON Felts... the 'peak of perfection'!"

*WIN... A NEW Shakespeare Spincast Fishing Outfit!

"What famous place reminds you of Hamilton Felts? Tell us why in a few words; sign your name and address and name of company. Each month, the idea from a papermaker that we use wins a new 1960 model Shakespeare Spincast Rod and Reel—FREEI When identical winning ideas are submitted by 2 or more papermakers, the one with the earliest postmark will be considered the winner. Every U.S. papermaker entrant receives a famous Rex Spoon fishing lure—FREE. Send me your suggestion—today. Ham Feltz, 612 First National Bank Bldg., Cincinnati 2, Ohio."

YOU CAN'T BEAT

Hamilton FELTS "'Pike's Peak Or Bust' was the slogan of the big Gold Rush year of 1859.

Shuler & Benninghofen was already a year old.

Since then, over 100 years of skill, experience and integrity has been woven into Hamilton Felts.

Every operation in their manufacture, from the selection of highest quality wools, through the careful looming, joining by hand, and finishing process—is characterized by our traditional code of craftsmanship.

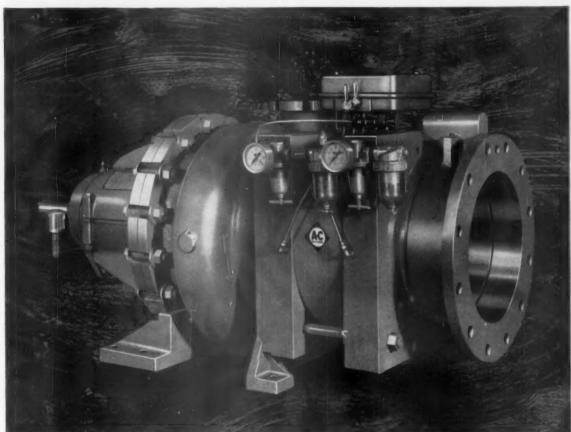
Today's Hamilton Felts—'the peak of perfection'— also incorporate the results of our continuing program of technical improvement."

If one of our 300 modern, technically proven styles won't solve your specific problem, we'll be happy to design a Hamilton Felt that will. Just ask your Hamilton Felts Service Salesman.

SHULER & BENNINGHOFEN, HAMILTON, OHIO

ALLIS-CHALMERS





New air control speeds response to varying head and capacity requirements.

Allis-Chalmers Adjustable-Capacity, Adjustable-Pressure Pumps now feature

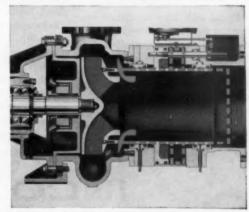
new instant control...new simplicity

Another advancement in adjustable pumping from the originators of the ACAP pump — an internal pneumatic control system adjusts the ACAP cylinder in a split second . . . automatically. Moving parts are reduced—gears and control motor eliminated. Installation and maintenance costs are reduced.

System consists of an air cylinder, ACAP cylinder, and piston. Piston is integral with the ACAP cylinder, and moves within the air cylinder. Increasing air feed to one side of the piston moves the ACAP cylinder in or out, thus regulating discharge flow. Regulation of flow through opening clearances instead of valve throttling or slowing pump speed, improves mixing, eliminates binding and plugging, and saves power.

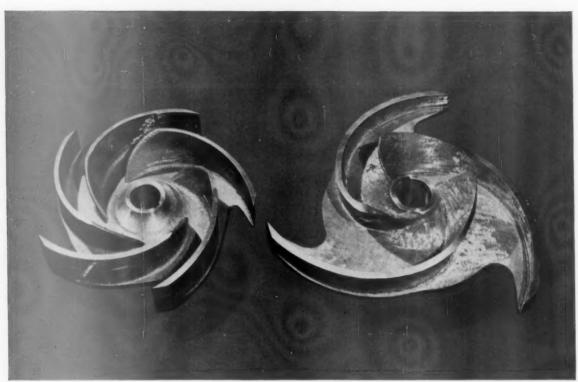
Oil mist lubrication through each air feed. Double seal arrangement prevents contamination of stock. Seal chamber is vented to atmosphere, resulting in immediate detection should either seal fail.

For full details, write Allis-Chalmers, Industrial Equipment Division, Milwaukee 1, Wisconsin.



ACAP is an Allis-Chalmers trademark.

A-1266



Unretouched photograph

Handling pulp liquor 9 years, and look! No corrosion, erosion, wear

Impellers are cast from 10% Nickel Stainless Steel

These impellers may look foundrynew, but they've spent the last nine years successfully fighting off a threeway attack. From corrosion and erosion by caustic liquors . . . from wear by suspended solids.

Faced with these conditions, engineers at Mead Corporation's Kingsport Division, Kingsport, Tenn., decided to standardize on impellers cast from ACI type CF-8M stainless steel. This grade contains 19% chromium, 10% Nickel, a maximum of 0.08% carbon, and 2.5% molybdenum. This nickel-containing combination provides an exceptional degree of corrosion resistance and

strength... to stand off the daily onslaughts of white, black and green liquors in this alkali-recovery operation.

Can you use such a combination... of corrosion resistance plus strength and resistance to wear and high-velocity impingement? Nickel Stainless Steels provide combinations of specific chemical and mechanical properties... well-suited to special requirements. Write for the helpful Inco booklet "Heat Resistant Castings, Corrosion Resistant Castings... Their Properties and Applications."

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street New York 5, N.Y.



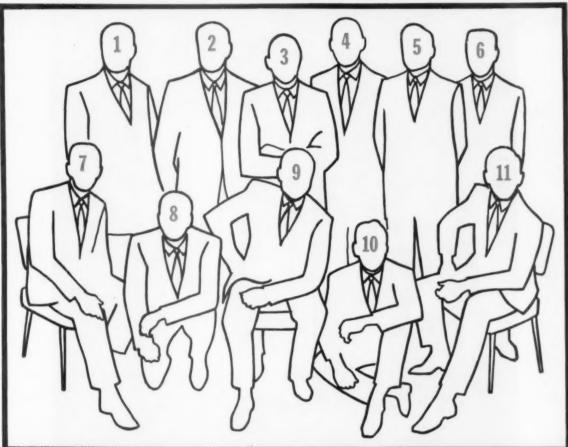
Recovering green liquor without downtime, these pumps are equipped with longlasting Nickel Stainless Steel impellers. They move hot caustic liquor with specific gravity of 1.16 at 350 gpm, 1755 pm.

INCO NICKEL

NICKEL MAKES ALLOYS PERFORM BETTER LONGER

ALLIS-CHALMERS





Group photo of 11 Allis-Chalmers paper industry specialists

too busy to pose

... but that's the way we work at Allis-Chalmers. Attention to customer service makes it hard to get these 11 specialists together for picture taking. Emphasis on giving prompt, practical solutions to the mechanical and electrical problems of our customers has given us a breadth of experience that no other manufacturer can offer! Whether you are looking for information on a single piece of equipment or on a complete process, contact your A-C representative or write the Industrial Systems Dept., Allis-Chalmers, Milwaukee 1, Wis.



F. R. Forrest Consulting Engineer



H. K. Kingsbu General Mill Pumps



L. C. Voge Paper Stor



H. A. Wrig Electrical



J. F. Fenske AC Motor



C. B. White, Jr. DC Motors and Variable Drive



J. E. Fink Screening



E. C. Mertz Lime Recover Systems



P. W. Clark Systems



L. F. Hayne Pulp and



R. N. Wilson Electrical Distribution



New Signode Compression Strapping Station

This skid of paper is being strapped on a Signode CS20-1 press, using the latest Signode methods. It will arrive at destination in top condition. Paper slippage in transit will be at an absolute minimum—85% less on the average than with other methods. The receiver will get more usable sheets of paper in every skid. He can use the paper directly from the skid without restacking. This mill has improved its product—yet reduced its costs per skid for time and materials.

Write today for all the facts about Signode strapping presses and tools for the paper industry... and for the facts about the money-saving advantages of strapping the Signode way.



First in steel strapping

SIGNODE STEEL STRAPPING CO.

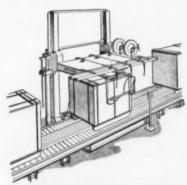
2672 N. Western Avenue, Chicago 47, Illinois

Offices Coast to Coast. Foreign Subsidiaries and Distributors World-Wide in Canada: Canadian Steel Strapping Co., Ltd., Montreal • Toronto

Here's proof: you can reduce paper slippage the Signode way

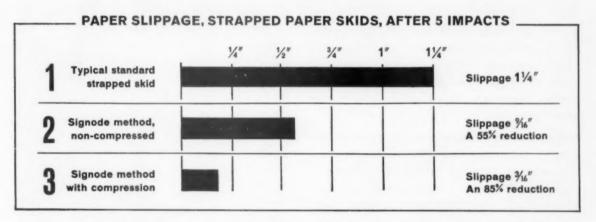


...55% without compression



...85% with compression

Signode engineers ran accelerated impact tests on an impact machine, comparing typical standard strapped paper skids with skids strapped the Signode way without compression and skids strapped the Signode way with compression. Here are the results.



The Signode way, with or without compression, actually costs you less for materials! And it means top value paper for your customer...more usable sheets per skid; fewer customer complaints; flat, square skids your customer (and you) can triple deck.

Write today for all the facts.

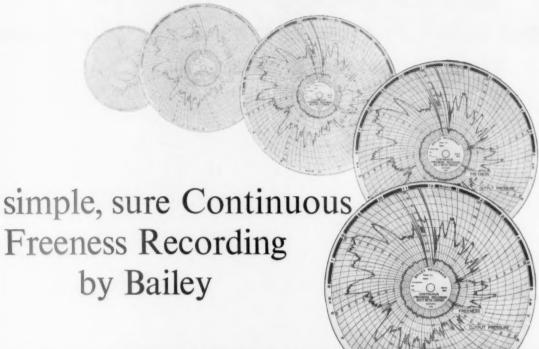


First in steel strapping

SIGNODE STEEL STRAPPING CO.

2672 N. Western Avenue, Chicago 47, Illinois

Offices Coast to Coast. Foreign Subsidiaries and Distributors World-Wide In Canada: Canadian Steel Strapping Co., Ltd., Montreal • Toronto Now...proved in continuous operation...



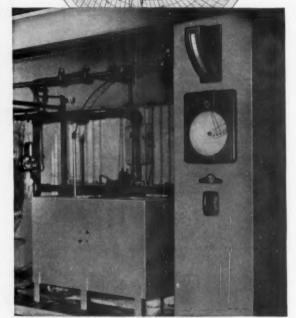
Dependable, continuous freeness recording has long been an objective of the pulp and paper industry.

Today it is a fact.

The Bailey Continuous Freeness Recorder, based on simple principles and utilizing equipment well-known by the pulp and paper industry, now provides a means for dependable, continuous measurement of freeness, proved in successful, continuing service for more than a year.

Its operation enables more accurate control of pulp stock characteristics...automatic control of refiners and jordans for sustained product quality. Performance is trouble-free...maintenance, negligible. Your Bailey Engineer will be glad to give you details. Call your nearest Bailey District Office, or write.

Bailey Continuous Freeness Recorder in operation at a Southern newsprint plant.



PULP AND PAPER DIVISION

BAILEY METER COMPANY

1037 IVANHOE ROAD . CLEVELAND 10, OHIO

In Canada - Balley Meter Company Limited, Montreal





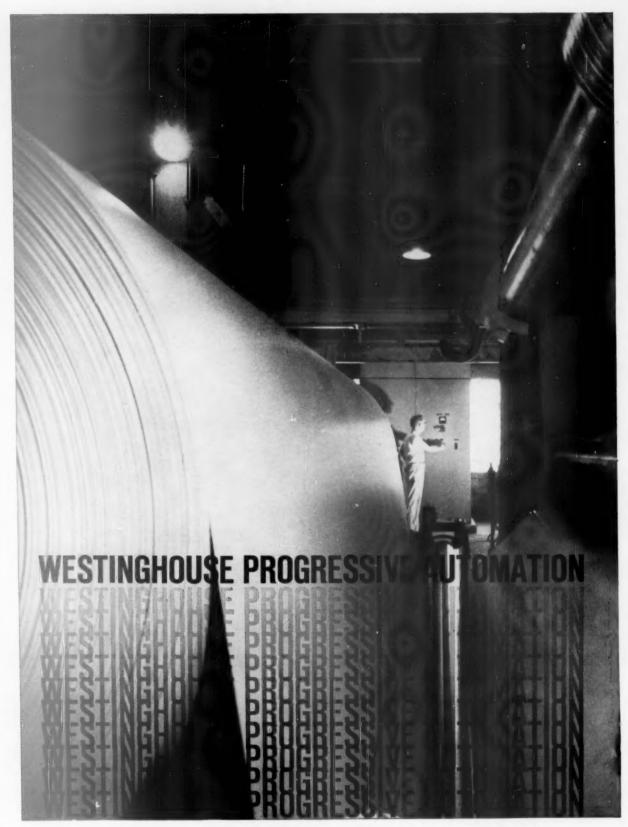
A cationic urea-formaldehyde resin, Scriptite 40 imparts a high degree of wet strength to paper, with less resin add-on. In addition to raising tensile and wet bursting strength, Scriptite 40 also improves dry tensile strength, dry mullen, wet rub resistance, internal sizing, pick resistance, dry stiffness, dimensional stability, and folding resistance. For technical assistance, samples, and literature, write to Monsanto Chemical Company, Plastics Division, Room 779, Springfield 2, Massachusetts.



MONSANTO DEVELOPER IN PLASTICS

The Monsanto line of paper resins also includes: **scriptite** so for unsurpassed printability and improved surface characteristics on boxboard. **scriptite** 33 a melamine wet-strength resin. **scriptite** 52 in combination with formaldehyde to give water resistance to folding boxboard and to jute liner. **scriptite** 54 for outstanding water resistance and both wet and dry rub resistance.

*scriptite: Reg. U. S. Pat. Off.

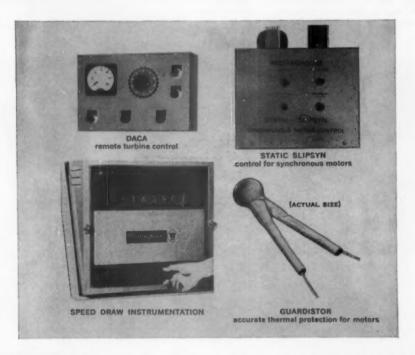


November 1960 - PULP & PAPER

A PRACTICAL, STEP-BY-STEP PROGRAM TO RAISE PRODUCTIVITY, IMPROVE PRODUCT QUALITY

Westinghouse *Progressive Automation* is a step-by-step program to help you reach your goals as economically as possible . . . and is thoroughly practical because it is tailored to your mill. Through *Progressive Automation*, many mills have already increased output, reduced off-grade losses through better quality control.

Westinghouse is ready today to help you plan and execute your next step in automatic production. We are prepared to recommend, furnish, install and maintain all equipment to fulfill your plan. For the first time, you are offered one source for all controls, computer systems and all other basic electrical equipment for paper mills . . . transformers, switchgear, motors, gearing, drives. You can be sure . . . if it's Westinghouse.



DACA . . . ULTRA-PRECISION IN PRO-VIDING AND CONTROLLING POWER Turbine-driven paper machines are now being controlled by the most precise equipment ever offered the industry-DACA* (Digital Analog Control Apparatus). Rapidly rising standards of paper quality require exact control of machine drives over a wide range of speeds. Here's how DACA meets this need. First, DACA holds line shaft drives to plus or minus 0.1% of preset speed through a 10-to-1 speed range. Second, a preset control gives automatic, precise speed selection throughout this speed range. DACA combines the best features of digital and analog techniques and uses static circuitry to provide high reliability . . . less

SPEED-DRAW INSTRUMENTS ... UP-GRADE EFFICIENCY, ACCURACY OF NEW OR EXISTING MACHINES The objective of this Westinghouse instrumentation—and to date the only practical equipment available—is more

down time.

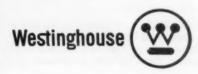
precise production control and reduction of off-grade losses. With digital readout, operators know the speed of any machine section at any time. Digital circuitry eliminates drift and, therefore, error. Either speed or draw is read to within one foot per minute, or 0.1 fpm. Both readout and printout devices are available.

SLIPSYN CONTROL ... THE FIRST AND ONLY STATIC DEVICE FOR ACCURATE CONTROL OF SYNCHRONOUS MOTORS New Westinghouse Static Slipsyn® Control precisely applies motor field excitation at proper speed and pole position up to and including 99% of synchronous speed. Transistorized networks throughout provide a new measure of reliability for automatic production. There are no moving parts to wear, corrode or fail. Existing control can be easily converted to static Slipsyn.

GUARDISTOR...STOPS MOTOR FAIL-URE CAUSED BY EXCESS HEAT The exclusive new Westinghouse Guardistor* motor gives you direct, accurate thermal protection against motor burnout. A PTC (positive thermal coefficient) thermistor, no larger than an aspirin, is embedded in motor windings, senses temperature rise instantly. At a predetermined critical temperature, thermistor has an approximate 100-to-1 change in resistance, activating the predetermined control function to stop failure.

For details on other Westinghouse apparatus for paper production, turn the page . . .

Trade-Marks



ADDITIONAL WESTINGHOUSE PRODUCTS FOR THE PAPER INDUSTRY

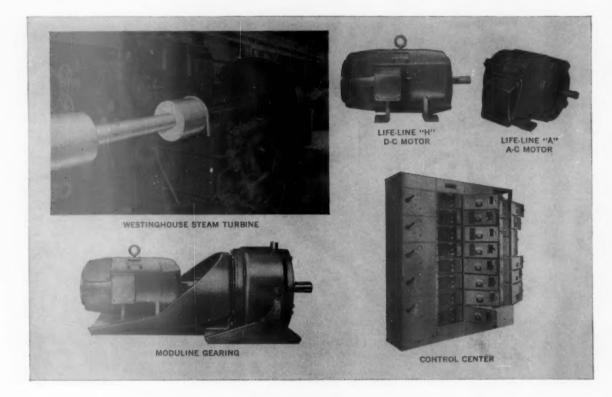
WESTINGHOUSE STEAM TURBINES... PRECISE SPEED REGULATION OVER A 10-TO-1 RANGE For mechanically driven paper machines, Westinghouse variable speed turbines have long proved to be the ideal power source. Extremely close speed regulation is the key to making high-quality paper... and this turbine provides it over a 10-to-1 and greater range. Same regulation advantages are inherent for driving multiple generator sets on sectional drive.

NEW D-C MOTOR ... 35% INCREASE IN COMMUTATING ABILITY Newly designed, the Westinghouse totally enclosed Life-Line® "H" d-c motor now gives you even higher performance, as measured by a 35% increase in

commutating ability, and a new armature, cutting inertia 55%. The result is faster response, improved insulation and ventilation.

LIFE-GUARD... FROM INSIDE OUT, MAXIMUM PROTECTION AGAINST MOISTURE, CHEMICALS Life-Line "A" motors, the familiar work horses of industry, now have the super-protection of new Life-Guard* insulation on drip-proof motors. Consists of a completely new vacuum-impregnated epoxy encapsulation of all windings. Standard Life-Line "A" motors are protected by dependable Bondite-Mylar† insulation, giving you twice the life expectancy of conventional insulations.

†DuPont Registered Trade-Mark



MODULINE GEAR UNITS LET YOU CHANGE GEAR RATIOS RIGHT IN YOUR OWN MILL The modular design of Westinghouse Moduline* drives saves you time and money. Now you can change gears right in your own mill to take advantage of changing manufacturing techniques on improved processes. No more delays . . . Moduline never becomes obsolete, always permits rearranged configuration rather than expensive replacement. This is the newest member of the Westinghouse family of geared drives, reducers and gearmotors designed for the paper industry.

CONTROL CENTERS . . . FLEXIBILITY TO CREATE PRODUCTION LINES FOR TODAY AND THE FUTURE Motor controls, compactly grouped in structures such as this, free production areas, provide centralized control. In-

dividual control units may be added, removed or replaced quickly and easily. One location speeds maintenance and service. One-man supervision means coordinated motor operation, a basic requirement for automated lines.

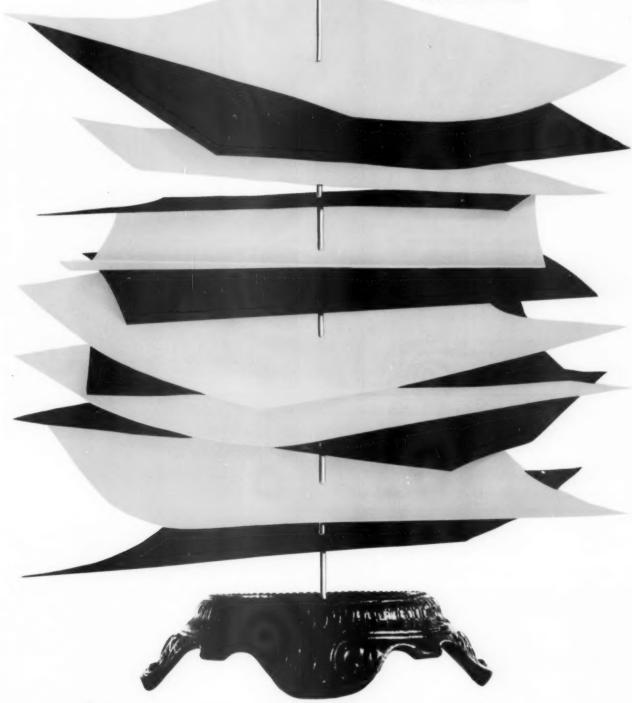
Your nearby Westinghouse representative can help in putting *Progressive Automation* to work for you. Give him a call, or write Westinghouse Electric Corporation, P.O. Box 868, Pittsburgh 30, Pa. You can be sure . . . if it's Westinghouse.



Now Cyanamid brings you

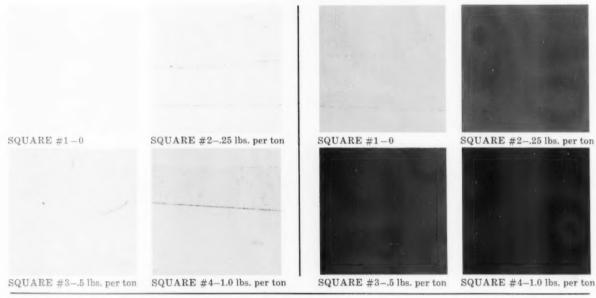
accurac*24

Retention Aid



the finest retention aid on the market today that the finest retention aid on the market today that the finest retention aid on the market today that the finest retention aid on the market today the finest retention aid on the market today.

here's visual proof of pigment-saving



Each block contains equal amounts of blue or yellow pigment. The ACCURAC 24 content varies from zero to 1.0 pounds per ton of paper as indicated. Color specifications may be maintained by adding ACCURAC 24 in appropriate amounts while reducing the amount of pigment added to the stock. Or, additions of ACCURAC 24 to a given amount of pigment will intensify the final color.

Note the advantages of ACCURAC 24!

Aids retention of fillers and costly pigments such as TiO₂ and colored pigments. Same color specifications with less pigment added. Retention of fines for improved formation of the sheet. Less fines in white water. Less load on

save-alls. Less 2-sidedness in colored paper. Faster machine drainage. ACCURAC 24 is being successfully used in the paper industry to improve the retention of fines and pigments. For full information, send for Cyanamid's data sheet on ACCURAC 24.

CYANAMID



a new level of competence in the mixing of fluids

You get more work out of these all-new LIGHTNIN propeller-type mixers.

They'll handle bigger batches, heavier materials, or do the job faster - without using more power.

Often a smaller, lower-cost model will do the job you want done—on less power than you've been using. That's how efficient they are.

And that's not all. In normal use, you won't have to lubricate these mixers for five years.

Overloads can't hurt the gear drive.

The chemical plant motor is standard, at no extra cost.

You can install closed-tank models on smaller tank flanges to save money and space.

The stuffing box gives you a new high in sealing and in repacking ease. Or a standard rotary mechanical seal squelches leaks from vacuum to 200 psi, from -120° to +485° F-and can be replaced in minutes if ever necessary.

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Industry's Growth Continues

Pulp production is up 5%; paper up 4%; board up 1%; exports way up; construction paper and board down 5%; profits about equal to 1959

• "What's the state of the pulp, paper and paperboard industry as it goes into the final quarter of 1960? The industry got some answers to this question recently when the American Paper & Pulp Assn. held a press conference in New York City.

"The industry is healthy and the future looks good. Healthy because the industry is riding high and still going up. Can't say 1960 will be a boom year. It will be good. Not rosygood. Not pie-in-the-sky good. Just good," said APPA's president Howard E. Whitaker.

The industry will make more paper in 1960 than ever, about 2% higher than record-breaking 1959, and more paper again will be made in 1961. Demand for the first six months of 1960 has improved. "I don't see any reason for a decline nor for a sudden upsurge," stated Mr. Whitaker, who is also chairman of the board, The Mead Corp. The sudden surge in 1959 was unusual and was a recovery from a bad recession.

Benjamin J. Slatin, APPA economist, was quick to point out that comparisons between 1960 and 1959 were unfair because 1959 had its own situation, so that comparing the first nine months of 1959 with the first nine months of 1960 is not appropriate.

Prices will hold even, said Mr. Whitaker. As chairman of Mead, he would like to see them rise, he said, but doubts if they will because of competition. Despite rising labor and fringe benefit costs and higher chemical costs, he said, the industry cannot pass them along. It has been a good many years since competition has been as keen as today.

Profits in 1960 will remain about the same as 1959 and will stay at that level for 1961 unless there is a breakthrough in costs.

Asked if the industry was worried about plastics, Mr. Whitaker said it

was a matter more of being aware than worried. Everybody in the industry is studying plastics very carefully. Dozens of combinations of plastics and paper are just around the corner, particularly in packaging. Plastics stimulate rather than threaten, he said. Paper has always been safe because it is a cheaper product, but plastics are becoming cheaper and more competitive. The time will come, he predicted, when paper and plastics will threaten other industries, such as steel.

New Products

There has never been a time when so much work is being done on new products research as this year. As a whole the industry is spending some \$63 million on all research, will probably spend \$100 million by 1970.

Misleading, said the APPA President, is the monthly production ratio figure. Obviously, as capacity rises and output remains steady or increases slightly, the ratio percentage declines. For instance, because of millions of expansion dollars, 92% capacity in August equals 96% in the first six months.

Denouncing the pessimist, Mr. Whitaker said, "We grow with the national economy." And, he might have added, we have the capacity to keep the pace. When the national economy slides, the paper and paperboard industry (especially the latter) slides apace. You can't sell boxes if people aren't buying TV sets.

Pulp and paper's capacity growth is keeping pace with the national economy. This remained Mr. Whitaker's theme. A 2% increase in 1960, on these grounds, equals 4% in 1959.

Total paper and paperboard production in the first nine months of 1960 reached 25.9 million tons, 2% up from the 25.4 million tons in the same period of 1959. Paper was up 4%, to 11.6 million tons; board up 1%. Construction paper and board dropped

about 5%, to 2.4 million tons.

Major gains were in printing papers. Total printing paper production was up 5% due to increased activity in printing and publishing. Coated papers showed the largest gains.

Sanitary paper growth continues, while coarse papers had little change from 1959.

Most paperboard grades had moderate changes in production. Special foodboard (for frozen foods and cigar boxes) were about 10% ahead of 1959.

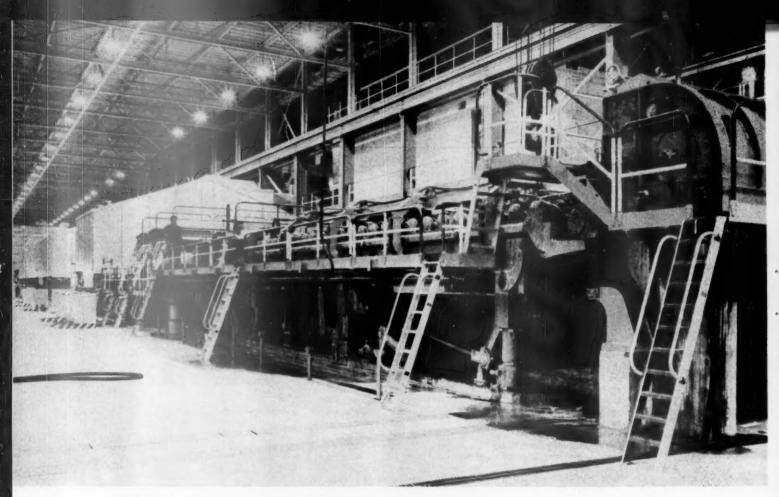
Woodpulp

Woodpulp continues to gain in importance as a raw material; new supply for the first three quarters was about 3% above the record 1959 highs. Domestic woodpulp sources continue to grow in importance, while imports of woodpulp are down slightly. Exports are almost double 1959 rate. This sharp increase, says APPA, reflects both the prosperity in Europe and the opening of a new Europeanowned market pulp mill in the U.S. (Bowaters' Catawba, S.C.)

Total domestic woodpulp products ran above the 25 million ton/year level, 5% above 1959 record. These high rates of woodpulp production have been matched by comparable gains in pulpwood consumption, now above the 40 million cord/year rate.

Sales Are Up

Paper and allied products sales were at the \$12.5 billion/year rate, some 3% ahead of 1959. Sales and profits for corporations in the paper and allied products industry for the first half of 1960 were 2% ahead of 1959. Apparently, says APPA, the gain in productive efficiency was absorbed by the 3% increase in average hourly earnings and the increase in the number of employes. Rate of return on invested capital averaged 8.8% for all manufacturing and 9.6% for total non-durable goods.



EXCLUSIVE PICTURES BY PULP & PAPER show machine operators threading the first commercial coated sheet through the 325-ton/day Black Clawson machine at Marathon Southern mill.

Marathon's Board Machine Accents

New Southern addition at Naheola features near ultimate in automation; three trailing blades; seven high velocity dryers

By WILLIAM F. DIEHL Southern Editor, PULP & PAPER

Frank Lloyd Wright, whose architectural prowess was sometimes overshadowed by his philosophical wit, was once asked which of his many works he thought was the greatest.

"The next one, my boy, the next one," was his reply.

His comment is most apropos of the paper industry today. As each new machine comes on line, great new things seem to be in the offing. The machines get bigger, faster, more automated, more progressive in the fields of coating and drying. Marathon Southern's new coating machine at Naheola, Ala., can well be considered one of the industry's most exciting additions. It is automated from front to back, has a revolutionary con-

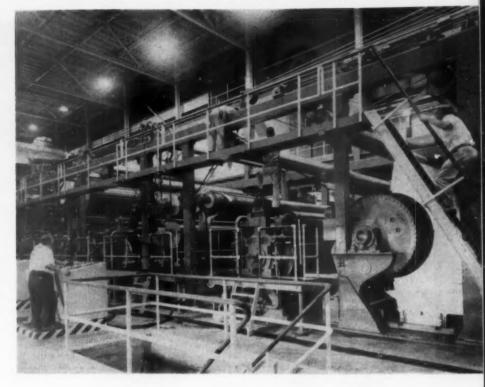
cept in additives, three trailing blade coaters, seven Gardner air dryers, a new type headbox, horizontal size press and is as versatile as an ambidextrous paperhanger. The Black-Clawson machine will

The Black-Clawson machine will boost this mill's daily production to a staggering 500 tons a day of paper, board and tissue, quite a sizable figure for a mill which has just celebrated its second birthday. The new machine immediately will assume a role previously played by Marathon division's Oswego, N.Y. board mill, which was sold and officially becomes the property of Hammermill Paper Co., Erie, N.Y., on Feb. 1. The successful start-up of the board machine at Marathon Southern, however, may push this date up to November. This long-term agreement dates back to the time Marathon started up its big

Southern mill. William Stolk, then president of American Can Co., announced soon after start-up that a third machine for production of board would be added at the Southern mill and sale of the Oswego mill would be consummated as soon as continuity of production was assured by the new machine.

This move was in line with Marathon's concept of its Southern operation. Conceived in 1953, the mill's original design made room for this expansion. As a major producer of pulp, paper, paperboard, packaging materials and household products, Marathon studied some 40 locations before it decided to locate in the heart of a region which it felt had strong anticipated population growth. One of the factors involved in determining this mill's product: The rocketing trend





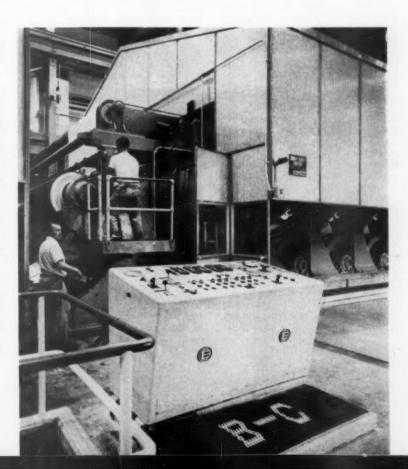
Pushbuttons

EXCITEMENT OF FIRST RUN is captured in these pictures. Above, machinetender races up stairs to assist pulling tail of sheet through second Rice Barton trailing blade coater. Gardner air dryers are visible in front of coating rolls. Below, John Fulkerson, asst. board mill supt., directs threading of sheet through the horizontal size press. Shakedown of machine was "remarkably easy," according to Marathon officials who gave credit for easy start-up to three-month training course.

toward self-service marketing which indicates a per capita increase in packaging materials of 20% by 1970. Some economists have forecast a 50% increase in the market for paper food containers in the next five years, according to Roy J. Sund, now pres. of American Can.

To achieve its goal, Marathon sent into the field a study team composed of research, woodlands, engineering, manufacturing, and marketing specialists. It included John Spalding, manager of Marathon Southern, George Brabender, asst. mill manager, and J. V. Martin, woodlands manager. The site chosen is here in western Alabama, halfway between Linden and Butler and 25 miles south of Demopolis. With a converting operation in nearby Newnan, Ga., Marathon can now serve the South from the very heart of the region.

Responsibility for the design and construction of the original mill was placed with Dr. Ferdinand Kraft, Marathon's general pulping supt., Harry Gottnauer, chief plant engineer and John Spalding, MIT graduate and



SEQUENCE SHOWS KEY MACHINE AREAS as first commercial sheet is put through. In first picture, tail is clearly visible as it is being threaded through first bank of four Gardner air dryers, located directly after the smoothing press. First dryer section follows it. Next, machinetender hauls in tail, preparing to throw it into third press section following size press. Calender stacks come next, each of them seven in stack with the bottom roll an Accra-Nip Crown Compensating roll for nip control. Final picture was taken a few moments before the first commercial coating run started as the Hi-Lo Jones pulper eats up broke. Conveyor stretches back under the size press and starts automatically in event of paper break. Broke is automatically pumped back to Dorr-Oliver saveall which feeds broke into system through a Warren high-density stock pump. Threading took less than hour.



a veteran papermaker from Salisbury, Mass., then supt. of Marathon's papermaking operations in Wisconsin.

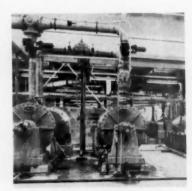
"We leaned heavily on J. E. Sirrine's design ideas in the building of the mill," Mr. Spalding told PULP & PAPER, "and in much of the process design, recovery, pulping, that sort of thing. Chas. T. Main Co. was retained on a preliminary basis to evaluate merits of building at Naheola."

At this stage, Mr. Spalding pointed put, Marathon was a major consumer of purchased pulp. With completion of the mill, however, it was prepared to enter the market pulp field with Harold Skinner as sales manager for pulp and Urbane Krippene in charge of paper and board sales. A 250-tonday wet machine with vacuum mold, two H-800 presses and a Flakt dryer produced bleached pulp. The new mill also boasted a highly versatile 192 in. trim Beloit Fourdrinier machine for paper and lightweight board equipped with a Rice Barton trailing blade coater and Gardner air dryer, and a Beloit 2500 fpm tissue machine with a 12 ft. Yankee dryer producing toilet tissue and napkin stock in the 10-17 lb. basis weight range. A converting plant adjacent to the machine rooms produces toweling and napkins.

With the addition of the mill's stellar attraction, its new board machine, production of pulp has temporarily halted, with pulp now being gobbled up by the new addition. The new machine was designed by Marathon's central engineering staff in conjunction with Rust Engineering Co., who also handled construction. To direct production on the machine, Marathon assigned veteran Benjamin J. Guenther, who had been supt. at Mosinee, Wis. As board mill supt. Mr. Guenther was in on the design of the machine from the beginning, made 21 recommendations on the first design of the machine, 20 of which were accepted. In May, 1959, he was transferred to Central Engineering and last May learned he would be supt. of the board machine.

"This was the smoothest start-up I've ever seen," he commented, "probably due to the extensive training program of the men who are working on the machine. The second day after start-up, Tom Orr, our technical supt., and I took several rolls of paper over to the Newnan plant. They ran at normal speeds there and produced first-grade cartons. During the first 24 hours after the machine started we changed the tension on some of the rolls about 15 to 20 points and that was all we did—the backtenders never even realized the changes were made.

"We had a few doubts about the start-up. We were afraid the first bank of Gardner air dryers was a little too far back (it is behind the smoothing press) but they are doing just fine. We also started up with a pretty high density rubber on the Manhattan Self-Skinner rolls but they are coming through royalty, we're not even using doctor blades. The first wire, an Appleton, is a gem and will probably last two months, and the Cincinnati rolls are on the money."



STOCK BEGINS JOURNEY to the machine through three Emerson Claflin refiners. After proportioning box, two more Claffins are used. Then stock goes to pre-mix.

Stock Prep Is Straight-line

The board machine currently uses about 50% pine, 50% hardwood bleached pulp, some of which is dried and baled first on the pulp dryer. A 100-ton high-density tile-lined broke storage chest with DeZurik consistency regulator provides a backstop of broke for about eight hours continual operation. Initial refining is through one or all of three Emerson Claffin automatic plug-loading refiners driven by 400 hp Allis-Chalmers motors. A proportioning chest provides storage for the addition of additives before a second bank of two Emerson Claffins. From there, stock goes to a pre-mix tank where the remainder of additives are put in and it is then pumped to the machine chest.

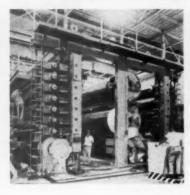
Freeness can be varied automatically in two Jones Leviathan automatic plug-loading jordans with Accru-Set controls. From the jordans, stock is retained in a stuff box prior to cleaning through 18 primary, three secondary and one tertiary Bauer Centri-Cleaners. A vacuum pump draws off rejects. It is then pumped

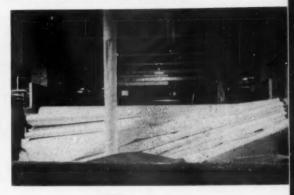


FREENESS IS CONTROLLED by presetting two Jones Leviathans with Accru-Set controls. Pulp is then ready for trip to stuff box, via magnetic flowmeters, regulators.

. . Marathon Southern's Board Machine







through an Allis-Chalmers Acap fan pump with 4 to 1 rangeability through six primary and one secondary Black-Clawson screens to the headbox. Stock enters the headbox through a "Y" shaped stem to the multiple inlets, remaining in the box only nine seconds.

Blueprint of the Machine

The Black-Clawson machine has a 238 in. wide Fourdrinier which trims to 220 in. and is equipped with a partial ruler deckle, the first five feet followed by deckle straps which Supt. Guenther feels will give him "7% more trim than a full ruler deckle."

The dandy roll is movable and can run before, over or after the 12 suction boxes. The sheet passes from the wire through the straight-line first, second, and third presses, the predryer, the hot press, and the smoothing press before going under a bank of four Cardner air dryers. From there it goes through the second and third dryer sections. The horizontal size press is the latest design and is followed by a split dryer section, one on top, the other on the bottom to re-

move the curl from the sheet.

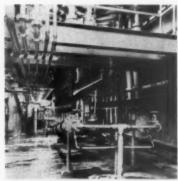
The breaker and finishing stacks each have seven nips and are Accra-Nip crown compensating stacks with 1,000 lbs. of hydraulic pressure available for curving the rolls and regulating the sheet nip. The three Rice Barton trailing blade coaters are each equipped with a Gardner air drver and are arranged to give a coat to each side of the sheet with the last two blades available for double-coating on one side if necessary or specified. According to Mr. Guenther, the first blade used was "broken in" in less than an hour and produced a salable sheet almost immediately with little or no streaking. The sheet passes straight from the finishing stack into the bank of coaters and then goes directly to the Black-Clawson reel. A Black-Clawson slitter and rewinder rerolls the finished product and automatic strapping is provided behind the rewinder.

Broke System is Automatic

A specially designed broke conveyor stretches back along the machine to the size press and is started automatically in the event of a break. It is designed to handle full machine speed broke into the Jones Hi-Lo pulper and is pumped from there back to the Dorr-Oliver vacuum saveall, which turns itself on and off as needed. A Warren high-density pump then delivers stock from the saveall system for blending back into the stock system of the machine.

Line Drive Highly Efficient

The machine is driven by a Reliance variable speed d-c line drive which has short belts for maximum efficiency. Power is delivered by a Westinghouse turbine. The clean, straight-line drive shaft is located directly behind the machine on the operating floor, will provide speeds from 270 to 600 fpm. A Vickery felt cleaning system serves clothing and in general motors and pumps are standardized. Allis-Chalmers motors are used throughout the board machine with General Electric starters on major equipment. Piping is 316 ELC stainless steel throughout.



PRIMARY BAUER CENTRI-CLEANERS are located beside headbox and fed through magnetic flowmeters. There are 18 primary, three secondary and one tertiary Bauer cleaners.

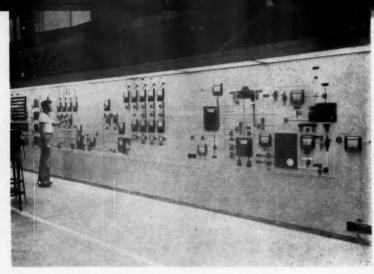


UNIQUE JAMAR-OLMEN HOOD features open side with blast of air through small opening beside catwalk to the hood, setting up wall of air to retain heat from dryer rolls.



DECKLE STRAPS CAN BE SEEN at edge of wire. According to Supt. Ben Guenther, use of straps instead of deckle rule will provide machine with increase of 7% in sheet trim.

Automation becomes reality as Marathon sets its sights on "forefinger control" and little gadgetry...



MAIN MACHINE PANEL contains all automatic instrumentation for stock preparation and broke systems. One button sets the entire system in motion. Visual level controllers, remote manual controls, graphic flow sheet are included.

The board machine is very likely the most completely automated machine in the industry to date. The decision to go in for heavy but "practical" automation was a joint decision made by Mr. Spalding, Mr. Guenther and Central Engineering. Under the direction of Richard Fricton, Central Engineering's instrument supervisor, Harold Miller, instrument engineer, was assigned to the project. One important aspect: Foxboro instrumentation was selected largely on the amount of assistance which the company promised to provide rather than on competitive bidding. As a result Foxboroman John Lavigne was assigned to the project too. A second Foxboro instrument man, Bob Bradley, worked with Marathon engineers in calibrating the instruments. A conservative estimate of savings attributable to this concept: \$30,000. Marathon feels it rid itself of 99% of troubles before they started.

The basic instrumentation concept was carried out, where practical, to include both the paper and tissue machines too. In all, the instrumentation system cost some \$600,000, will probably be worth many times that in its hairline quality control and error-saving aspects alone.

Five instrument engineers worked on the design of the instrumentation and during the final check-out and start-up, Marathon's Central Engineering had nine instrument engineers and two mechanics as well as two Foxboro engineers on hand to insure against any errors which might prove costly later. Said one machine tender: "This machine turns itself on, runs itself, stops if it makes a mistake, corrects itself and starts up again. It's a pleasure to come to work!"

Foxboro magnetic flowmeters and Fisher & Porter consistency regulators are used ahead and behind almost every step in the stock preparation and additives systems. An example: Flow of pulp into refiners is automatic. Flow controllers are reset automatically by the level in the stock chests ahead of them. As level lowers, valves are opened and chests fill themselves. This keeps flow of stock through the refining system constant at all times. This same theory works backwards from the machine.

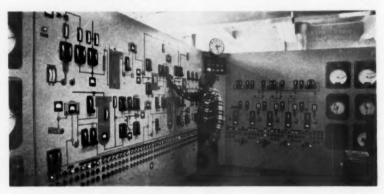
At the proportioning chests, additives are metered into stock through separate lines, each equipped with its own magnetic flowmeter and flow regulator. As machine demands less refined stock, consistency regulators and flowmeters alter the flow to keep in step with the refined stock. Demand for jordaned stock is preset by couch and vacum demands. Although freeness is preset by remote manual controls, it and other variables are controlled electronically once they have been established.

Machinetenders take over the operation of the system after stock leaves the jordans. An F&P automatic stuff valve and beta gauge tighten the quality control on the pulp and minimum to maximum flow through the Allis-Chalmers Acap fan pump is automatically controlled.

A DeZurik consistency regulator controls flow of pine and hardwood stock from high-density storage. It is blended carefully and remotely with broke which comes from an automatically self-starting Dorr-Oliver saveall. Beckman instrumentation controls pH.

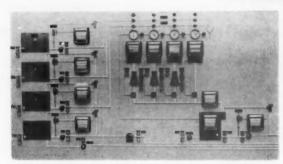
Electronic Safety Factors

The entire machine has an extensive electronic interlocking system which prevents mistakes throughout the process. This keeps pumps or fans from starting out of sequence, also shuts down the process in the event of a serious error along the line. All critical points have alarm Panalarms. A red light beams, bells ring, and the point at which the trouble is brewing is indicated by lights. A constant check is also maintained on all aspects of the flow through continuous metering

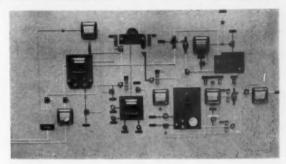


ONLY BLEACH PLANT OF KIND IN NORTH AMERICA has this elaborate graphic panel provided by Bailey Meter. The panel features a recorder section providing circular chart records and a functional graphic panel which provides the operator with a complete visual picture of the five-stage process.

... Marathon Southern's Board Machine



REFINING PANEL shows how graphic concept simplifies control. At left, visual level meters give chest depths. Miniature flow indicators are next. Refiners are pictures with lights to indicate when operating. Proportioning chest controls are below.



BROKE SYSTEM PANEL shows extensive magnetic flowmeters, Fisher & Porter consistency regulators. Stock flow can be followed by lines from one stage to next. Warning lights and reset buttons are on board to simplify operations.

and totalizing of stock, additives and utilities. If anything gets excessive it is immediately apparent to the operator. These controls also include the electrical equipment, line drive and GE starters. All control panels, including those in the additives department, are graphic.

Instrumentation Is Progressive

Instrumentation throughout the mill follows this same general theory, although perhaps not quite as automated. Bailey Meter Co. provided the extensive instrumentation in the boiler, recovery and bleaching facilities. The Riley coal and bark fired boiler has Bailey combustion control, three-element water feed control and two-element stream temperature control. Since bark is fed "as available" the master steam pressure controller regulates coal feed to the boiler. Proper ratio of air flow is maintained by a measure of steam and bark flow. A Bailey oxygen analyzer is used as a guide to proper combustion.

The two 181,000 lbs. steam/hour Babcock & Wilcox recovery boilers are base loaded by automatic control of black liquor flow. Automatic combustion control is accomplished by black liquor-total air ratio control, total air-primary control, tertiary air contol and furnace draft control. Once again, Bailey oxygen analyzer is used as guide for proper combustion conditions.

The bleach plant also features centralized controls. The panels are divided into two sections, the recorder section and graphic section. Bailey recorders provide continuous circular chart records while the graphic section provides a complete visual picture of the entire process. From a high density bleached stock control panel, the operator can automatically supply consistency-controlled stock from any of five high-density storage chests to any of the semi-bleached, pine-bleached, or gum-bleached pulp chests in the paper machine room.

Foxboro instrumentation is used ef-

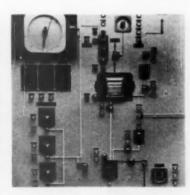
fectively in the brown stock and cooking areas. The digester system provides a rate-of-rise and hold schedule as required for each of five 2-in, thick mild steel digesters. Cooking temperatures at top, bottom and center of the digesters are recorded as well as automatic digester liquor measurement. Remote controls are also provided for blowing the digesters. The sixth digester is equipped with a stainless steel heater for indirect cooking.

Careful instrumentation also provides quality control through three Impco pre-knotters, Impco three-stage brown stock washers, through four Impco primary screens and one secondary and to a Dorr-Oliver valveless decker. Screen rejects go through a Sprout-Waldron refiner and return to screens and rejects from the pre-knotters are dewatered in a Jackson-Church press before returning to the digester.

Conoflow Corp. supplied numerous control valves insuring hairline quality control to both paper machines.



LINE OF FLOWMETERS and regulators is located on mezzanine floor. These control flow of dyes, other additives to various chests.



AUTOMATIC COATING SYSTEM has its own graphic panel. At left, under flow graph, are preset dials for controlling solids into system.



MACHINE SPEED INDICATOR on the first press panel swivels to give operator easy view during operation and when starting machine.



NICKNAMED "MOTHER FARIN'S KITCHEN" after Central Engineering expert Bill Farin, center, additives area has twin control panels facing across catwalk.

Centralized additives system provides superfine quality control, relieves messy operations . . .

An automated and centralized department set up in a special area in the new machine room addition provides a clean, wide-open area for preparation of additives. Designed by Central Engineering's William Farin. it enables operators to see at a glance what is happening in the preparation of additives, unload bulk and liquid materials and avoid some of the normal pitfalls connected with additive preparation. A specially designed piping system also provides unique delivery of additives at the exact location where if is most advantageous to obtain desired results. Fingertip control of all additives is made possible, and a system of cutoff valves has been included in the delivery lines to permit back-flushing and cleaning of pipes.

Dry chemicals are emptied at a hopper car pit with a screw conveyor in the bottom. A star valve picks up from the conveyor and compressed air is blown through the bottom vane, delivering bulk material through a specially designed system provided by Superior Seperator Co. There are five 4500 cft. Buffalo Tank Co. dry chemi-

cal silos, each with a special line. A hose from the star valve can be connected to any of these five lines by means of a microswitch. The switch insures tight connection. Bulk chemicals can thus be delivered simply to any of the five silos. Dust is filtered at the top of the silos which hold calcium carbonate, fine grade clay, coarse clay, internal starch, and size press starch. The tanks are steel, epoxy-lined.

Liquids such as alum, clay slurry, and wet strength resin are received in liquid form and are used as received. Here, too, Marathon has introduced innovations. Rosin size, for instance, is delivered in pastes form in tankers. The problem of keeping the lines hot for smooth delivery of the paste has been solved by linking the delivery line to the live steam line used to heat the tanker. These two lines are insulated together and the line remains hot as long as the tanker is being Allis-Chalmers heated. EquiSeal pumps are used to prevent leakage at the line shaft.

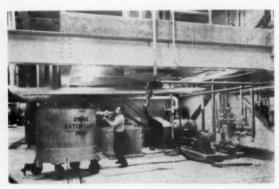
Clay slurry, which is received at 65% solid form, is pumped through a

Wilfley pump, designed to handle sand originally, and is doing an "excellent job." A special series of cutoff valves permits steam and water to be pumped through the lines after the clay is delivered, thereby keeping lines clean. The lines, flushed after each delivery, have yet to clog.

How Circulating Loops Work

Perhaps the most interesting feature of the additive system is a series of looping pipes for delivery of additives to the machine. This looping system services internal starch, titanium dioxide, wet strength resin, two different dyes, pitch dispersant, defoamer, lime, rosin size and clay slurry. The lines circle out past the machine and return to the delivery point. They are reduced to smaller lines on the return route to provide sufficient pressure, or the supply is throttled through a "V" port. The take-off lines at the machine are selfdraining to prevent clogging, Material circulates through these lines and can be drawn off at any given point. Cutoff valves permit closed circuit circulation to flush out the lines.





CHEMICALS ARE FED AUTOMATICALLY in clay coating area into Read Standard sigma mixer, lower right. The coating mixture then dumps into specially designed batch carts, right, and are towed to machine. Carts provide machine flexibility.

Marathon Southern's Board Machine

All stock and broke to the machine is proportioned through magnetic flowmeters and consistency regulators. The main stock meters are used as master meters and the supply of eleven different additives is also separately provided through flowmeters each maintaining the supply of additives at a set rate called for by board specifications. Additives are shut-off and started up automatically without the necessity of readjustment.

This loop system simplifies delivery of additives to the machine in other ways. Example: 49% alum is received in 8000 gal. tank cars which are padded with compressed air to blow the alum to storage. Only equipment needed is the alum tanker, two A-C EquiSeal pumps (one is a standby) and the take-off loop. Alum circulates back to the tank through a screen. A pH meter on machine is used to check and readjust proportions when required. Velocity of flow and continuous screening keep lines open.

Starch Cooked Automatically

The starch system is also an innovation. For size press starch an automatic weighing station uses a star valve and blower from the silo to the weighing hopper. The starch is weighed automatically by Richardson scales and delivered to a vibrating hopper through a dust collector. The hopper can handle 4000 lb. batches. Two automatic starch cookers prepare up to 1500 gals, of starch each and can be diluted to 2000 gals. Each cooker is served by four 3 in. steam ejectors. When the batch is complete, operator pushes button which opens valve and a Moyno 200 gpm pump empties the tank. The valve closes automatically, pumps stops, water feeds in, then starch, and the cooker rises to temperature and goes into a timed heating cycle. When completed, the cooker waits for the operator to

DRYBULK DROPS from hopper to screw conveyor, is carried pnuematically through hose to one of five lines for delivery to storage bins. Lines have micro-switch controls.



empty it again.

From the internal starch loop system the take-off goes to starch cooker utilizing a constant supply of dilution water cooks starch and delivers it to the machine. On shut off the cooker is automatically flushed.

Calender and Coating Mixtures

The trailing blade coating makeup is handled in its own area. Stabilizer solution is mixed first. It is held in a mix tank and batch pumped to the Read Standard sigma mixers as flow demands. Calcium carbonate, fine, and coarse clays are weighed in an automatic weigh hopper and dropped to sigma mixers with the rate of flow determined by the present horsepower of the mixer. As maximum hp is approached, flow stops. Small amounts of water can also be added to the sigma mixer.

Latex is next added, blended with small amounts of water to set the solids. The batch is then discharged through flexible piping to specially built bulk cars which can be hauled to either machine. The carts are connected through Moyno pumps to the trailing blade system. Once again, variable speed permit the 30 to 75

gpm Moyno pumps to circulate the mixture when the blades are not demanding it.

When the coater goes on, shutoff valve closes and valves to the coater open. The mixture circulates into the coater reservoir over the blade and overflows back to Sweco screens. Moist air system prevents equipment from clogging up. The carts permit a flexible operation, with changes in grade or specification readily available without coating losses normally encountered by the use of long lines.

Calender and size press solutions are prepared in batch form in the additives building and pumped to hold-up tanks at the machine. The system is set-up to handle two different types of coating at the calender stacks. Solutions in the holdup tanks can be brought to temperature and a constant level maintained from the additives building.

Batch preparation methods were used throughout to maintain maximum flexibility so necessary changes can be made with a minimum of equipment revisions. The additives area is also designed with space for additional equipment should increased capacity demand it.



ADDITIVES ARE MEASURED into clean, open chests ahead of headbox through automatic flowmeters.



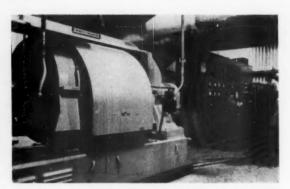
LOOPS WHICH ARE SECRET to continuous circulation to machines can be seen in overhead shot.



AUTOMATIC STARCH COOKERS dump through Moyno pumps when cook is completed, fill themselves.



ACCENT IS ON SCREENING in pulp mill where pulp first goes through an Impco pre-knotter, then through these Impco screens.



REJECTS ARE GIVEN SECOND REFINING in this Sprout-Waldron machine. Jackson-Church mill provides dewatering facilities.

Pulping Continuous from Digesters

The pulping process at Marathon is proportioned continuously from the digesters. Special accent is placed on screening. Impoo pre-knotters controlled by magnetic flowmeters send rejects back for recooking in one of

the six Chicago Bridge & Iron mild steel digesters. Accepted stock is screened over a line of five Impco Turbo-Flow, Jr., centrifugal screens. Screens rejects are prefined in a Jone's jordan and go through an 800 hp Sprout-Waldron refiner, then are screened again over the primary screens. A Jackson-Church press can be used to dewater booth screen and knotter rejects.

Screened stock is thickened over an 11½ ft. by 18 ft. Dorr-Oliver valveless decker. Two Kalamazoo tile-lined storage chests can retain eight tons each of screened stock.



FIVE STAGE BLEACH SYSTEM features chlorination, caustic, hypochorite, chlorine dioxide and hydrogen peroxide. Mill feels this gives stable brightness, little pulp degradation.



BLEACHED PULP IS STORED HERE in four Kalamazoo tile tanks. The fourth tank is used for off-color pulp which is later fed back into system. Stainless steel or rubber is used in all piping.

Five Stage Bleach Plant, First in U. S.

Believed to be the first system in North America to use five stages of chlorine, caustic, hypochlorite, chlorine dioxide and hydrogen peroxide, the bleaching plant gives Marathon an increase in stable brightness with minimum pulp degradation. Pine and hardwood are bleached to about 85 brightness although Marathon has little trouble reaching 90 if necessary,

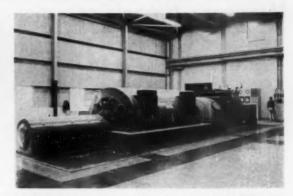
according to asst. mgr. George Brabender. All piping is either 316 ELC stainless steel or rubber, depending on which is needed.

Stock goes first to a preretention tower for an hour and a half and then enters the upflow-chlorination tower. Caustic and hypochlorite towers are both downflow and the chlorine dioxide and hydrogen peroxide stages are upflow. Kamyr supplied the single and double shaft mixers (air and star feeder combination and the single shaft chlorine dioxide mixer which follows the final stage. Five 9½ ft. by 16 ft. Impco washers are used in the system and bleached pulp is stored in four 30 by 60 ft. Kalamazoo tile lined chests at 3½% consistency. One of these chests is used for storage of off-color pulp which is later fed back into the system and is then dissipated by rebleaching it in the last two of the five stages.

. Marathon Southern's Board Machine



RECOVERY BOILER features shot cleaning, recovers 95% lime and produces 181,000 pounds of steam an hour, has venturi scrubber.



POWER IS GENERATED in this gigantic 22,500 KVA General Electric turbine which draws its steam from Riley stoker boiler.

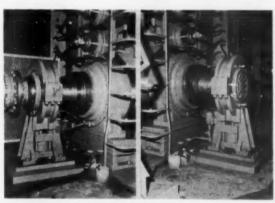
Special Features of Recovery and Power

Spent cooking liquor is fed to a Swenson six-effect, surface condensing evaporator which includes a soap skimmer, internal heating on five of the six bodies. Fully instrumented, it evaporates liquor to about 54% solids. The Babcock & Wilcox recovery boiler is equipped with a venturi scrubber and cyclone separator, air heater and economizer and shot cleaning system using Gardner-Denver compressors. The boiler produces about 181,000 lbs. steam/hour and recovers 91% lime.

A Traylor 9 by 250 ft. kiln has four Bjoyner stainless steel sections to distribute mud and get better utilization of gases. Developed in Sweden, it replaces the usual chain inside the kiln. The gas-fired unit has three thermocouples for temperature control and is equipped with a Peabody scrubber. Power is supplied by a Riley Stoker boiler and a 22,000 kva General Electric turbine which operates at 850 lbs. steam per hour at 825° F. A specially effluent system which cost more than half-a-million dollars protects the nearby Tombigbee River.



REDUCED COST, SAFETY are chemical area features



ACCURATE CROWN CONTROL provided by Accra Nip

Chemical Preparation Centralized

Chemical preparation is centralized into one area for convenience in unloading and handling. One operator and a helper can handle the entire area. Centralization provides safety, single control, lower labor costs. Bleaching solutions including concentrated caustic, hypochlorite bleach liquor, stabilizing agents for hydrogen peroxide and chlorine dioxide are prepared here.

Chlorine and chlorine dioxide are stored in Pfaudler Permutit Glasteel tanks to guard against corrision. Water is also demineralized in this area for the boilers and the area acts as an unloading station for caustic soda, chlorine, sodium chlorate, sulfur dioxide and other chemicals.

Roll Bending Calender Stack

Unique component of No. 3 machine is the first commercial installation of a Black-Clawson Accra Nip calender as the dry stack in the two-stack calender section. The bottom roll undergoes bending to obtain most effective crown for a given operating condition without regrinding. Crown corrections are made from a control console during operation.

This development was announced during Paper Week 1960 in New York, N. Y. It is used on an open-side calender and features bearing weight compensators. (The Accra Nip was described fully in the April 1960 issue of PULP & PAPER, page 83.)

Marathon's Naheola operations are guided by these key men



JOHN SPALDING General Manager



GEORGE BRABENDER Assistant Manager



EARL MOAK Paper Mill Supt.



HANSELL WADE Pulp Mill Supt.



BEN GUENTHER Board Mill Supt.



GEORGE SMITS Finishing Supt.



RUSSELL KACMARYNSKI Supt. of Engineering Planning



JAMES KOCHA Plant Engineer



MONROE LLOYD Utilities Supt.



ROBERT STEPHENSON Technical Services Supt.



TOM ORR Technical Supt.



JOHN FULKERSON Asst. Board Supt.



RICHARD FRICTON Central Engineering-Instruments



TOM KENNEDY Rust Engineering-Construction

Thank You, Marathon Naheola . . .

This exclusive report on Marathon's new Naheola mill reflects not only on the creditable job done by Southern Editor Bill Diehl, but very much on the excellent cooperation which Marathon and the men, who run the mill, gave to Mr. Diehl. To these men, PULP & PAPER says thank you.

How Will Paper Machines Change?

Some parts may be eliminated. Lower basis weights are coming. But don't bet too much on air formation replacing water medium

By Dr. BORJE STEENBERG
Director, Paper Technology,
Swedish Forest Products Research
Laboratory

 Tokyo
 Research and development in pulp and paper is being carried out with a high intensity the world over. Results emerging from these activities will change the manufacturing technique of papermaking and make existing machinery obsolete.

The main theme of this article is not to judge whether new developments in papermaking may have intrinsic values per se, but rather what impact such methods will have on the economics of a paper mill contemplating installation of current types of machinery.

The rate of turnover in terms of capital investment is rather small in a paper mill. Capital investment is largely measured also in absolute terms. Consequently the time of depreciation must be considerable. It is of great interest to the investor that the machinery not become obsolete due to technical innovations in manufacturing methods.

Because it is difficult to produce more than a limited range of papers on one machine, this machine may become obsolete due to changes in the use of papers as well. Either new types of materials, such as synthetics and plastics, may be used instead of present types of paper or board, or new properties may be required of papers which cannot be imparted by existing machinests.

existing machinery.

In this article three assumptions are considered:

1. Major industrial turning points cannot be predicted by trend studies;

Revolutionary industrial methods always require higher capital investment for economic units than do classical methods.

3. The paper industry will be considered a typical growth industry.

A paper machine is in reality a

Excerpts from Dr. Steenberg's talk at the FAO Conference on Pulp and Paper Development in the Far East, held at Tokyo, Japan, Oct. 17 to 31. Dr. Steenberg is winner of the Alexander Mitscherlich medal for scientific services to the pulp and paper industry.

series of machines coupled together. Each part performs radically different operations.

In a mechanical industry producing machines or machine parts, the raw material passes through different operations generally performed in a series of machines such as lathes, planers, milling or drilling machines. Between each machine, unfinished goods are stored for different lengths of time. This storing is not possible in papermaking. The sheet being formed on the wet part of the machine must be pressed immediately because it cannot be stored in a wet state.

A breakdown in a unit in a mechanical factory does not necessarily lead to a standstill in production, because it is possible to work from stores of half-finished goods. In a paper machine, a failure of one individual section means a complete standstill. There seems to be little chance that this state will change due to research and development, because paper is inherently weak and difficult to store in any form between the pulp and dried paper stages.

Complete Machine Not Obsolete

Reliability of each individual part of the paper machine must be high, especially since the machine is running in shifts. Any breakdown in production means that the full costs of operation must be paid without anything being produced. The reliability of the complete machine is equal to the product of the reliability of each part. This requires that the reliability of each part is very nearly one, if the reliability of the full machine, composed of thousands of parts, shall become as high as is normal, namely about 0.95.

The probability that the complete paper machine will become obsolete is as probable as that a new and better method will be found for performing each individual operation. This probability is small, but if it occurs it is unlikely that this new technique immediately will reach a productivity and reliability comparable to the classical paper machine.

The incentive to start and carry out necessary research for such a development is also small. Present machinery is an adequate foundation for a prosperous and growing industry. It is



Dr. Steenberg

difficult to pinpoint weaknesses in the basic design which would motivate a search for entirely new methods. Financial requirements needed to reach a design of such superior economy and reliability, compared to present type designs, would be so large that probably no papermaking enterprise or machinery builder in the world would be able to meet them. Also, the tremendous capital invested in the world's paper machines, approximately 6,000 at present, imparts a certain sluggishness to any revolutionary developments.

Developments must be slow because of the complexity of the operation. It is seldom sound to introduce more than one innovation at a time in a paper machine. If several new methods are tried at the same time, the possibility of analyzing the reason for faults or failures is rapidly decreased and the financial risks grow in geometric proportion.

There is thus little risk that a complete papermaking machine will have to be scrapped during its depreciation time due to new methods in papermaking. It is possible that certain sections may become obsolete and have to be replaced by new parts so that the mill will remain competitive.

The influence of new methods in papermaking boils down to designing machines so that their parts can be easily rebuilt. Because the life span of a paper machine is long (about 50 years), rebuilding and modernization is a regular procedure. There are paper machines in operation which were built more than 100 years ago. These machines are remodeled to such an extent that it is not ust a joke to

... Steenberg: How Paper Machines Will Change in Future

say that only the width of the original machine still exists. Parts can be replaced but the maximum width of the paper being produced on the machine cannot be changed without changing all parts at one time.

There are three main points to be considered: (1) The maximum width of the trimmed sheet from the paper machine; (2) maximum mechanical design speed; and (3) available space.

Machine Width

Width of a paper machine is fixed and its determination is important. Assume we are considering a machine for a certain amount of tonnage. A wider machine would have fewer dryers and could be run at lower speeds. The difficulty in producing high quality paper increases considerably with increased machine speed. For higher basis weight papers, the production in principle will on both machines types be limited by the drying capacity which is assumed equal, since the narrow machine is running faster.

If a paper machine is to produce the same tonnage of paper at a lower basis weight, it has to run proportionately faster. There is, of course, a maximum machine speed. This may be because paper quality is not up to standard if run at higher speeds, or that too many breaks in the web will occur or simply that the machine shakes to pieces. This point is reached sooner on the narrow machine.

Machine Speed

Every machine is designed for a maximum mechanical speed which determines the diameter of most rolls. Small diameter rolls will eventually reach a critical speed and start to vibrate violently. New knowledge of papermaking may some day allow paper of a particular type to be produced economically at higher speeds.

Many older machines today are running at more than double their original design speeds. This is possible because the machines were built for very low speeds where the critical dynamic properties were not the decisive factors in mechanical design. Also, because at that time the limited knowledge in machinery forced the manufacturer to make the design especially heavy to be on the safe side. Modern paper machines can hardly be run much faster than their design speeds without problems.

Two paper machines originally designed for the same production, one wide and one narrow, but both with the same maximum mechanical de-

sign speed, have widely different possibilities in taking advantage of new papermaking methods. The wide machine is better suited for the future. If two machines of the same width but with different design speeds are compared, the one with the highest design speed has the best survival possibility.

The drying section of the paper machine is the most expensive one and consequently must have the longest life span. It is important that the dryend be designed for high mechanical speed. Also, maximum permissible steam pressure in the dryers should be high. A dry end of a paper machine be designed for not less than 1,200 fpm or 1,500 fpm. For many machines, the design speed should be considerably higher.

The third important factor is the space into which the machine is to be built. Machine room and adjoining spaces both for beating and refining equipment and especially for finishing operations should be designed with space for expansion. A large basement is also a valuable asset.

Eliminate Dryer Section

The innovation which might be considered most important from the financial viewpoint would be elimination of the dryers since this is the most expensive part of the machine. Assume that the dryer section is not needed, that the paper is dry formed. This would have little effect upon the steam plant, which would still be needed for power and heating. The fact that low pressure steam will not be used must be supplemented economically by a larger production of power in the condenser turbines.

Once the dryer section of the paper machine is installed, and at least partially depreciated, it seems unlikely that new paper drying methods will be so much cheaper to build and operate that existing, partially depreciated dry ends will be uneconomically operable.

What About Air-Formed Paper?

Any method by which paper does not have to be dried obviously requires air as a formation medium instead of water. Many felted fiber products have been made by blowing fibers onto suitably formed wires. Theoretically, paper can be made the same way. In air formation, since cellulose fibers do not stick together, a glue is required to bond the fibers and give the paper its required strength.

All fibers tend to entangle or floc-

culate, even dry fibers. To obtain a uniform product during the forming process, it is necessary to suspend fibers so that the chances that they collide and flocculate are small. This means high dilution. Fiber entanglement in water and air follow approximately the same rules. In air formation, about the same weight of air has to be used as fiber carrier, as weight of water in conventional papermaking.

Due to the low specific gravity of air, this means that in air formation about 1.000 times more volume of air must be moved than water volume conventionally used. Moving these huge amounts of air requires fans and air ducts of enormous sizes to obtain production rates comparable to present machines. Because air is compressible, larger amounts of energy are required to move the corresponding weight of air than water. In air formation in all probability temperature and relative humidity of air must be controlled, which will mean considerable extra costs especially in warm and humid climates.

The introduction of air formation paper machines with capacities comparable to modern paper machines will require about the same capital investment. Little can be guessed about operating costs and reliability of the equipment. Cost of glues required to stick fibers together cannot be materially lower than cost of conventional beating of pulp and steam for drying; the two normal operations by which papers are given their strength.

Minor Changes More Likely

Novelties in papermaking machinery in all probability will deal with comparatively minor changes.

Among more recent innovations are various vacuum-forming cylinder machines for broad production, multiwire machines of the Inverform type, vacuum pick-up installations to transfer lightweight paper between wire and press sections, combination presses, and high velocity air drying equipment. These innovations can be installed on conventional machines without rebuilding more than a section of the machine.

Basis Weights Will Decrease

An important factor in the development of the use of paper, which applies to all fields of paper and board, is that basis weights of papers and boards tend to decrease. Better strength properties allow a thinner sheet to be used and improved opac-

ity makes it possible to use printing and writing papers of lower basis weights.

To meet this development the future paper machine should run at higher speeds than at present to produce the same tonnage. Because many older machines cannot be speeded up, lightweight papers and boards generally command a premium price because of the loss of volume in production when running lighter grades at higher speeds. A machine designed with ample reserve for high capacity of lighter weight papers should not need this premium to the same extent,

and will consequently be competitive for a longer time.

When Changes Are Neccessary

Theoretically, a paper machine designed to produce most grades of papers at will should have a high flexibility for adjustment to change in quantities of different types of papers which may develop. This method of layout is not recommended.

A paper machine is so complicated and so hard to run with high productivity that any unnecessary parts should be deleted. If the machine is too versatile in range, it will at all times have a number of parts which are not in use. This will result in decreased production.

Finally, in a growth industry, provided that capital is available, a new machine should be installed as soon as caculation shows that it will give higher profit than an existing machine. If the owner of the paper machine does not make this investment, somebody else will and will thus be better off in the future. This new machine is thus in a better condition to be adapted to the new and coming uses of paper at the time of its planning.

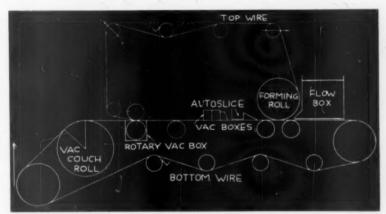
Inverform: Modified Paper Machine

In the foregoing article by Dr. Börje Steenberg, he discusses modifications to the paper machine that are more likely to come than any radical change or complete substitution for the machine as it is known today. One such modification Dr. Steenberg mentions is the Inverform, shown here.

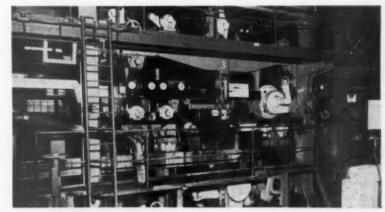
The Inverform was developed by St. Anne's Board Mill Co., Ltd., in Bristol, England and supplements the conventional Fourdrinier wire with one or more top wires. Experimentally, it has produced papers at speeds in excess of 3,400 fpm, and paperboard at 1400 fpm.

St. Anne's converted its No. 4 fourcylinder machine to a 140-in. Fourdrinier with four Inverform units. Each unit is alike. Each has a flow box ahead of the top wire. Each wire is 40-ft. long by 140-in. wide. An Auto-slice dewaters upwards. Stock flows onto the bottom wire immediately before the nip created by the top wire passing around a large-diameter forming roll. The bottom wire is supported under the forming roll by large-diameter table rolls. The two wires, with the stock between them, pass to the Auto-slice. This is a stiffbeveled scraper blade which presses lightly against the inside of the top wire. Water is forced upwards through the top wire along the sloping blade into the tray and then returned to the

Additional dewatering is accomplished by inverted vacuum boxes and rotary vacuum boxes. The sheet is pressed by a rubber-covered baby press roll, the bottom roll being in a suction box, the top roll fitted with a suction slice.



ARRANGEMENT OF INVERFORM UNIT on St. Anne's No. 4 machine is shown in this sketch.



FOUR INVERFORMS have been added to this No. 4 converted 118-in. trim board machine. Present speed is limited by dryer capacity to 350 fpm at 55 lb./M sq. ft. St. Anne's proposes to extend the drying section to increase speed to 650 fpm at some basis weight, although wet end potential is 1,400 fpm.

Modernizing at Billeruds

Swedish kraft mill installs new machines and processes. Economizer saves on maintenance in new recovery plant

By ALBERT W. WILSON Editor, PULP & PAPER

-Säffe, Sweden

In this exciting period of expansion and improvement in many pulp and paper companies, Billeruds AB, one of Scandinavia's greatest, is maintaining its reputation for introducing new equipment and pioneering with new methods.

This is certainly true at Gruvön Mill, one of Billeruds' five pulp and paper mills. Others are at Jössefors (where a pioneering two-stage continuous pulp mill has attracted worldwide interest) Kyrkebyn, Slottsbron and Billerud, which is close by the company headquarters and research center here at Säffle. The company also has five sawmills and 25 power stations and operates extensive forests—in this "heart-land" of Sweden—on a sustained yield basis. At Billerud, it should be noted that the first Kamyr continuous digester for NSSC pulp was introduced in 1957. It utilizes birch wood.

Now at Gruvön Mill about 30 kilometers north of here, the writer was witness to several innovations being made by Billeruds. Gruvöns Bruk, a kraft pulp and paper operation, is at the town of Grums, and like Säffle and the other mills except Jössefors, it is at the northwest end of the great lake of Vänern the largest lake in west Europe.

What's New at Gruvöns Bruk

1. A modern Walmsley paper machine being built in England—No. 5 for Gruvöns Bruk—will be the first in Scandinavia to have marking rolls at the MG cylinder to produce ribbed paper for wrapping. This dispenses with a need for special felts. KMW of Karlstad is building the inlet, It will be 180 in. wide.

2. A new underfeed type of winder is being introduced, built by British Winders Ltd. One serving the No. 4 machine, 215 in., was started up in August and the other will follow No. 5 machine.

 The first 12 knife helical type of blade chipper to be used in Scandinavia is in use at Gruvön, supplied by KMW.

4. A new continuous bleach plant

with latest equipment and one-man central control operation, designed and engineered by Kamyr AB and Billerud engineers. It will increase the bleached kraft pulps at Gruvöns Bruk from 20,000 to 70,000 tons. The plant will have 6 stages, including 2 stages of chlorine dioxide. Total production at this mill will be 86,000 tons of paper this year.

 A new Babcock & Wilcox 400 ton capacity recovery boiler, built by Götaverken, with an Ekströms economizer is proving exceptionally successful in reducing maintenance costs.

The Recovery Boiler

The recovery boiler at Gruvöns Bruk is one of the largest in Scandinavia and the economizer is the largest one Ekströms ever built. With this capacity its use is of interest to mills in this range outside Europe.

The recovery boiler was designed in close cooperation between the people from B&W, Götaverken and Bilerud. The startup of the plant in August 1959 was unusually successful. One day they just started up, and the boiler has since been running more than one year without any shutdown except during the holidays. This result can be partly due to the soot blowing delivered by Superior, of Stockholm. There are 14 automatic blowing pipes on each side of the boiler. The sooting medium is high pressure air at 18 a.tm. which is a little unusual, as steam is most common for soot blowing in Scandinavia.

The economizer, delivered by A. Ekströms Maskinaffär of Stockholm, has made it unnecessary to employ extra men for washing and, in fact, it

makes possible a three-months interval between washings.

The shot cleaning system, also supplied by Ekströms, was described by Billeruds operators as very efficient, but blowing the shot back upward a distance of 28 meters is not the way they would do it "the next time." It would be better to use mechanical lifting, they said.

The important point, as Billeruds operators say, is that washing and maintenance have been made very easy and economical. The economizer is in three sections. The boiler keeps running with only two sections as the actual boiler load is only 300 tons.

There is no need for extra men; the regular crew suffices. Only three men are required to run the recovery plant and the two of the three power boilers. All of these are Babcock & Wilcox design. The graphic control boards are behind glass and provide a very simplified operation. Siemens controls and instruments are used, and the design was worked out with Billeruds engineers.

There are two old recovery boilers at this mill, of 80,000 pph capacity. The new one alone takes care of present need and can go as high as 125,000 pph if needed. One of the old recovery boilers has a capacity of 135/150 tons per day. The other has 100 tons capacity. The new one with 400 tons capacity is all that is presently required.

"The larger the aggregates, the higher the efficiency," is a byword with recovery plant operators. The whole aggregate today at this mill is so great that there is no danger of lack of capacity. The economizer helps out



THOMAS WAHLBERG, production manager at Billeruds Gruvön mill.



TORE JANSSON, superintendent of pulp mill and recovery plant.

in this situation, according to Billeruds engineers, because, they said, it is a very tight unit, with very little leakage.

Precipitator and Scrubber

After the economizer is a Svenska Fläkt fabriken electrostatic precipitator. The efficiency of this unit is rated at 98 plus or minus 1%. The removal is by dry scraping method. After the precipitator is a spray-roll scrubber of the type which was developed only a few years ago at the Mo & Domsjö mill in Husum.

There are very fine small droplets which issue from four outlets and these capture the remaining chemicals in the effluent. Also the mill obtains warm water from this scrubber, via heat exchangers. This serves the bleach plant and the paper machines, enabling the operation of a warm backwater system.

The scrubber thus serves a double purpose, to recover part of remaining chemicals and to produce for the mill warm water.

The average of black liquor heat recovery in Sweden is about 60%, whereas in America the goal is only about 50%. Direct contact evaporators have been used generally in America to follow the multiple effect evaporators. The economizer, the Billeruds engineers said, may prove a successful substitute for direct contact evaporators in large capacity mills. This Gruvön mill compares in size with the larger kraft mills in America.

At this mill power also is supplied as a result of converting an old Tomlinson recovery boiler to a straight power boiler. This is right next to the new B&W recovery boiler. It provides 40 tons per hour of steam.

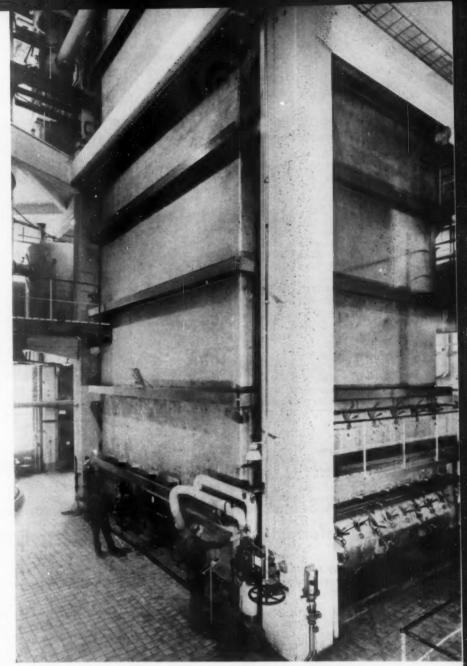
The Stal firm of Sweden provided two turbines. One is a condensate unit with 12,500 KVA, the other is a back pressure turbine of 12,500 KVA.

New Machine and Winders

The Gruvön mill has four paper machines in operation; of these, the last was new in 1952. Now No. 5, a Walmsley combined Fourdrinier, 180 in. wide, is due to start up about the end of the year. It will make bleached and unbleached kraft wrapping.

The new boiler, incidentally, will take care of this added production.

No. 5 will average about 40 tons per day of lightweight papers, from 30 to 70 g/sq.m. This machine will have a 15 ft. diameter MG cylinder of the high pressure type. It will be the first machine in Sweden to have marking rolls at the MG cylinder, in order to get the ribbing effect for the wrapping paper. There will be no need for the special felts.



RECOVERY BOILER, a B&W 400-ton capacity unit, built by Götaverken, is one of largest in Scandinavia.

The inlet for No. 5 a pressurized type, is being built by KMW.

The new type of underfeed winder made by British Winders Ltd. will follow this machine. The separate slippage ahead of the winding up is an advantage, according to the Billeruds paper mill operators. When the winding is underneath, they said, the rolls are harder and more even. It will operate at 1,200 m/min.

Already one of these units from British Winders has been installed and is operating after No. 4 paper machine, which is 215 in. wide. This was started in August. Its speed is likewise 1,200 m/min.

Other new equipment in this Bil-

leruds mill are the four Masson Scott refiners, also made in England, which will prepare the stock for No. 5 machine. These are the cone type, No. 2 size refiners. The same type of refiners are already running very well on No. 3 machine.

One of the first successful Kamyr continuous digesters was introduced in this Billerud mill. It now makes 150 tons a day of pulp.

Other New Developments

Gruvöns Bruk also has eight stationary and one Kamyr continuous digesters. Almost all pine is used here and some birch, which is barked in the woods. The mill's woodhandling

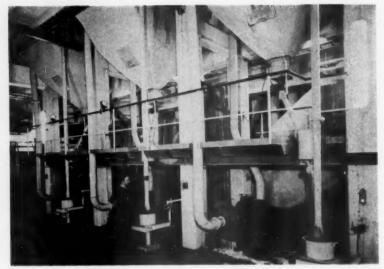
... Billeruds

has been greatly improved with a traveling crane of 35 tons capacity. It takes whole bundles of logs from Lake Vänern, lifting them direct to

the pulp mill conveyor.

The first chipper in Sweden of the Norman helical type, 96 in. with 12 knives, is here. This chipper was first introduced in Northwest U.S.A. KMW is making it on license and N.A. Eie of Stockholm and Oslo sells it. The new one at Billeruds produces 350 cu. m. of chips per hour. A 550 hp motor drives this chipper, which was started up in August.

Perhaps one of the most interesting new developments at Billeruds is the bleach plant, which will increase the bleaching capacity of this kraft mill to 70,000 tons. The present bleach plant of Gruvön has only 20,000 tons capacity of bleached kraft. It was one of the first mills in the world to have



SHOT BLOWING of Ekström economizer is efficient cleaning system. Shot is blown back upward 28 meters.

Comparing Kraft Recovery Plants

in Scandinavia versus North America. Some notable difference and information on investment and operation costs and economies

By BORJE THORSON, manager, and BERTIL FORMAN, assistant manager, Thermo-Technical Dept., AB A. Ekströms Maskinaffär, Stockholm

 The Scandinavian system as a rule has the following features different from the North American conventional design:

1. Evaporation in Scandinavian multiple effect evaporators concentrates black liquor up to 60% dry solids whereas the normal American system is designed for about 50% in multiple effect evaporators concencontact evaporators.

2. The utilization of waste heat from 750° to 250°F in the Scandinavian system is made with an economizer, consisting of one feed water and one recirculation water part, the last for external, indirect air preheating from 80° to 300°F.

The evaporation above 50% dry solids formerly caused depositing problems in the heavy liquor effect. Today these have been solved, mainly by arranging effect No. 1 as a double-pass apparatus to secure constant outlet concentration of 60% dry solids.

The first economizer with cast iron extended surface tubes supplied to soda recovery boiler of the modern

spray-furnace type was installed in Mo & Domsjö, Husum, Sweden, for the first Tomlinson boiler in Europe. Before the introduction of the steel shot cleaning system this and many other economizers were cleaned four times a day by water washing.

Today, however, the steel shot cleaning with increased specific shot quantities and improved design of tubes and their internal arrangement gives operation periods of 2-3 months between water washings. The economizer is arranged in at least two stacks. One is subject to water washing, while the other operates (and vice versa). The whole washing procedure takes 2-3 hours or in a year, 12-16 hours. The recovery boiler operates without interruption. Extra personnel for controlling the economizer equipment is not necessary.

Electric Precipitator

The gas exit temperature in a Scandinavian unit is generally 250-260°F. This low temperature does not cause corrosion in the electric precipitator

due to comparatively lower moisture content in the flue gas, as black liquor entering the boiler system has a dry solids content of 60% instead of 50%. At occasionally decreased loads, temperatures can be as low as 230-240°F without any flash-overs observed in the precipitator.

Long Economizer Life

The economizer has a long life as proved by the example at Husum. This economizer was washed by water five times a day from 1937-1949. The economizer is still running but during the last 11 years it has been continuously cleaned by steel shot. So are 120 other units of this economizer.

Why Cast Iron is Used

Cast iron has been used due to its high corrosion resistance during water washings. It also stands up against the wearing effect of the high specific steel shot quantities required for continuous operation of recovery boilers.

In the temperature region from 750°F down to 250°F the CO₂ percentage drops about 0.5%, corresponding to an air leakage of about 3%, a figure which is negligible.

Overloading a Scandinavian re-

a six stage sequence. The stages are chlorine, alkaline, hypo, chlorine dioxide, alkaline and chlorine dioxide. This sequence has been so successful that they are going to have the same in the new plant. The Holst process for chlorine dioxide bleaching is used at this mill, which has carried on considerable research in bleaching, together with the company's research center. The new bleach plant will start up early in 1962; construction is due to start in a few weeks. According to present plans, the hypo solution will be made continuous from lime mud and chlorine gas. Sandwell & Co. Ltd. is acting as consultants.

Some 85% of all paper made at this integrated kraft mill is exported from Sweden, Tryggve Bergek is resident manager at Bruvöns Bruk; Thomas Wahlberg is production manager; Tore Jansson is superintendent of pulp mill and recovery plant; Nils Vogt is superintendent of the paper mill.



NEW UNDERFEED TYPE OF WINDER, built by British Winders Ltd., serves No. 4 machine at Gruvön Bruk.

covery boiler (up to 40-60% above normal rate) has never caused any big problems, except for an increased depositing tendency, which is quite natural.

Investment Costs

The Scandinavian recovery system requires more capital. According to a calculation made by both American and Swedish boiler manufacturers, the additional cost pays itself back in a short time.

Calculations on equipment have been made on items being different in the two systems.

For the American system mainly the following parts were calculated: (1) the existing normal-design economizer with soot blowers, (2) the steam-coil air heater, (3) the direct contact evaporator and (4) extra flues with insulation.

This cost was deducted from the equipment typical for the Scandinavian system, including (1) Ekström cast iron extended surface tube feed water, (2) recirculation economizer, (3) the externally placed airheater, pump and pipings, (4) the steel shot system, and (5) the extra cost for extended multiple-effect evaporator.

Operation Costs

In the Scandinavian system the main advantage is the complete waste heat utilization for generating steam down to about 250-260°F. When the evaporation from 50% dry solids upwards takes place in a direct contact evaporator the heat is ex-

changed in ratio 1:1. If a sextuple effect evaporator does the same job, the ratio will be 1.5. This means that out of five parts of the additional steam generation in a Scandinavian unit, roughly, one goes for evaporation and four for the benefit of the mill.

With all items taken into account the Scandinavian system gives 10-11% higher thermal yield.

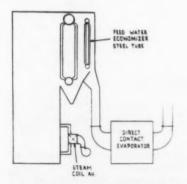
But no consideration has been taken of the heat value loss in a direct contact evaporator (i.e. when flue gas reacts with black liquor). This decrease is about 200-250 btu's per lb. of dry solids or 3-4% of the heat value.

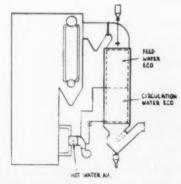
Break-Even Point in Two Years

Based on American figures for investment costs and average U. S. prices for steam and power, the Scandinavian system has a breakeven point in about two years for a 400 tons a day unit.

Today's average size unit has a tendency to pass this figure, which means reduced unit-cost for the boiler. On the other hand, oil, gas and coal will in the long run be comparatively more expensive than the investments which all contributes to shorter payback times.

There is one outstanding example of a big unit, comparable to those in North America. The Finnish mill of Kemi Oy/ has ordered a 700 tops B&W unit from Götaverken, Gothenburg, Sweden, with Ekström economizer as back end surface. This boiler will be started up in summer 1961.





DRAWING OF ECONOMIZER by Ekströms, used with Babcock & Wilcox recovery boiler at Billeruds Gruvön mill.

50 Biggest Paper Companies in World Listed in Publication "Vom Papier"

"Vom Papier" is a remarkable work in color printing which gives valuable information about paper and the worldwide statistics, history and important data, along with many unusual and interesting illustrations. This work is produced to celebrate the 75th anniversary of Feldmühle Papier und Zellstoffwerke A.G. of W. Germany.

There are many interesting facts in the book, including a calendar of historic events concerning paper dating from 3.000 B.C. to recent years.

Also in this volume is a list of what is described as the 50 world's largest producers of paper and paperboard. In many cases, only the 1958 figure is given and none is shown for the year 1950.

It should be noted these companies are ranked only for paper and paperboard. Several cellulose companies, or companies which make more cellulose than paper, have total tonnage higher than some of these listed. On the European Continent, Zellstofffabrik Waldhof made 248,000 tons of chemical pulp in 1959, but only 146,000 tons of paper. Of course, some American, Canadian and Swedish pulp companies would rank high in this table if cellulose was included.

But on the basis of paper-board production only, these are the top 50 companies, according to the Feldmühle statisticians:

			aperboard uction			Paper-Pa Produ	ection
		1958	1959			1958	1959
			Tons			In T	ons
1.	International Paper Co., New York, USA	3,380,000	3,707,000	26.	National Gypsum Co., Buffalo, New York, USA	362,000	
2.	Crown Zellerbach Corp., San Francisco, USA	1,439,000	1,619,000	27.	Jujo Paper Manufacturing Co., Ltd., Toyko, Japan	352,000	
3.	The Bowater Paper Corp., Ltd., London, England	1,222,000	1,320,000	28.	Anglo-Canadian Pulp & Paper Mills, Ltd., Quebec, Canada	349,000	
4.	St. Regis Paper Co., New York, USA	910,000		29.	Feldmühle, Düsseldorf, W. Germany	343,000	369,000
5.	Container Corp. of America, Chicago, USA	862,000		30.	Minnesota & Ontario Paper Co., Minneapolis, Minn., USA	317,000	
6.	Abitibi Power & Paper Co., Ltd., Toronto, Ont., Canada	822,000	896,000	31.	Marathon Div. of American Can Co., Menasha, Wis., USA	290,000	335,000
7.	West Virginia Pulp and Paper Co., New York, USA	770,000	883,000	32.	Holmens Bruks och Fabriks AB., Norrkoping, Sweden	262,000	279,000
8.	Mead Corp., Dayton, Ohio, USA	730,000	890,000	33.	Consolidated Water Power and Paper Co., Wisconsin Rapids, Wis., USA	256,000	277,000
9.	Scott Paper Co., Chester, Pa., USA	725,000	789,000	34.	Howard Smith Paper Mills, Ltd., Montreal, Canada	254,000	261,000
10.	Consolidated Paper Corp., Ltd., Montreal, Canada	688,000	716,000	35.	Australian Paper Mfg., Ltd., Melbourne, Australia	252,000	279,000
11.	Weyerhaeuser Co., Tacoma, Wash., USA	632,000		36.	Oji Paper Co., Ltd., Toyko, Japan	250,000	281,000
12.	Union Bag-Camp Paper Corp., New York, USA	625,000	816,000	37.	Longview Fibre Co., Longview, Wash., USA	249,000	305,000
13.	Continental Can Co., Inc., New York, USA	597,000		38.	Hudson Pulp & Paper Corp., New York, USA	247,000	
14.	Macmillan, Bloedel and Powel River Ltd., Vancouver, Canada	560,000	626,000	39.	Alton Box Board Co., Alton, Ill., USA	240,000	
15.	Champion Paper & Fibre Co., Hamilton, Ohio, USA	503,000		40.	Whippany Paper Board Co., Inc., Whippany, N.I., USA	235,000	
16.	Albert E. Reed & Co., Ltd., London, England	500,000		41.	Papierfabrieken Van Gelder Zonen NV, Amsterdam, Netherlands	233,000	256,000
17.	Owens-Illinois Glass Co., Toledo, Ohio, USA	461,000		42.	Oxford Paper Co., New York, USA	227,000	
18.	St. Lawrence Corp. Ltd., Montreal, Canada	456,000		43.	St. Joe Paper Co., Jacksonville, Fla., USA	225,000	264,000
19.	Enso Gutzeit, OY., Helsinki, Finland	454,000	522,000	44.	Cenpa, Paris, France	220,000	231,000
20.	Kimberly-Clark Corp.,	453,000		45.	Federal Paper Board Co., Inc., Bogota, N.J., USA	217,000	
21.	Neenah, Wis., USA Thames Board Mills Ltd.,	425,000		46.	Kymmene AB., Kuusankoski, Finland	216,000	219,000
22	Purfleet, Essex, England Price Brother & Co., Ltd.,	407,000	402,000	47.	Anglo-Newfoundland Development Co., Ltd., Grand Falls,	215,000	215,000
28.	Quebec, Canada Great Northern Paper Co.,	403,000		48.	Newfoundland, Canada Yhtyneet Paperitehtaat OY,	214,000	242,000
	New York, USA				Valkeakoski, Finland		
	Fibreboard Paper Products Corp., San Francisco, USA	385,000		49.	Cartiere Burgo, Turin, Italy	212,000	222,000
25,	Ontario Paper Co., Ltd., Thorold, Ont., Canada	370,000		50.	The Great Lakes Paper Co., Ltd., Fort William, Outario, Canada	188,000	

Sonic Fiber Separator

Fiber bundles are loosened and shaken apart by near ultrasonic vibration and are dispersed by high turbulence generated

• Sonic fiber separation is making its commercial debut in North America in five mills; four in the U.S.A. and one in Canada. The latest installation (May, 1960) is at the Los Angeles mill of Crown Zellerbach Corp. The unit was installed on No. 1 tissue machine, primarily to eliminate lumps that were getting into the tissue. It has done this satisfactorily, says CZ Paper Mill Supt. Lauron Giersch.

The ultrasonic defiberizer is called a Supraton and was developed in Europe. First installations were made in Germany in 1953. There are now more than 400 installations in Europe.

The Supraton consists of a rotor and stator. In appearance it resembles a cross between a small conical refiner and a pump. Grooved and vaned sections of stainless steel are mounted on the rotor, and the stator is lined with similar and opposing sections. The sectional cast shell has a small stock inlet at one end and stock discharge on the side at the large end. Stock is alternately compressed and decompressed in excess of 10,000 times/sec. as it passes through the specially designed groove. The volume of each chamber decreases and increases by turning of the rotor.

The Supraton is not a refiner, stresses the manufacturer. Its main purpose is to complete work left undone by the pulper, breaker-beater or other pulping equipment without cutting fibers or affecting freeness. This disintegration and resultant fiber dispersal results from cavitation and centrifugal forces applied within the unit. It is so designed that all stock admitted must pass through alternate areas of constriction and expansion by varying sizes and arrangements of the vanes on both stator and rotor. Stock is subjected to hydrodynamic pressure waves created by the high speed (3,600 rpm) of the machine. This speed causes high turbulence, which adds to the effectiveness and speed with which stock is broken up.

The ultrasonic defiberizer disperses fibers in furnishes of dried pulp, secondary fibers, machine broke including wet strength and de-inked stocks without cutting or hydration. It is said to maintain fiber length and free-



CHECKING INSTALLATION at Crown Zellerbach's mill on tissue, (left to right) are Lauron Giersch, paper mill supt., Robert O. Symon, Pacific Supraton and Maurice Vaucheur, export sales mgr., Seila.

ness because there is no metal to metal contact and therefore a negligible amount of cutting.

Power consumption is low, which is a main feature of the Supraton, and varies from 30 hph/ton on bleached and unbleached pulp; about 45 hph/ton on machine broke; 60 on dried groundwood or secondary fiber; and to about 60 to 65 on wet-strength papers.

Power savings is a big factor, especially in Europe where power costs are a considerable part of manufacturing costs. Supraton believes it can convince U.S. and Canadian mills that they too, should be more watchful of power costs. One U.S. mill has reportedly reduced its horsepower requirements from 1,000 to 200.

The unit handles consistencies ranging from 2% to 8% with 4% to 5% being optimum. Capacity is rated at 1,500 to 4,000 lbs./hr. There is only one size now made, but a larger unit is being considered because of the North American market. In Europe, the present model meets the needs of about 99% of the mills. Average daily

capacity is 25 tons.

The Supraton is sensitive to impurities and the company insists that clean stock be used and suggests a magnetic separator always be installed. In one installation the mill was not too satisfied until it was shown that "stock was dirty." A magnet was installed and gathered 60 lbs. of impurities in one day.

The Supraton, says the manufacturer, if ideally located, follows the pulper or dump chest, from which point stock can be fed under pressure or by gravity to the difiberizer. Free discharge is recommended to avoid loss of efficiency because of pumping.

The Crown Zellerbach installation is driven by a 75-hp motor and handles one ton/hour throughput with a power consumption of about 60 to 75 hp/ton.

Supraton is manufactured by the French firm, Seila, which is licensed by the German manufacturer, Deutsche Supraton GmbH, Düsseldorf. U.S. sales are handled through Pacific Supraton, c/o Robert Symon, 2243 Green St., San Francisco, Calif.

Paper Machine Prime Movers

Scope: Drive turbine and helpers as related to steam and power energy flow. Determinants: economics and heat balance

By H. H. FUEHRER
Westinghouse Electric Corp.

-Pittsburgh Pa. · Economic and heat balance considerations determine whether a turbine should be chosen as a prime mover. Horsepower requirements for the turbine must be established. Turbine efficiency (multi-stage, single-stage) and first price are of dollars-and-cents importance, and the decision is not irrelevant. Finally, a turbine governor has to be chosen in accordance with requirements for the turbine must be established. Turbine efficiency (multistage, single-stage) and first price are of dollars-and-cents importance, and the decision is not irrelevant. Finally, a turbine governor has to be chosen in accordance with requirements of machine operation.

With the paper machine—as with other manufacturing operations—individual study is required to determine the best power source, steam or elec-

Many paper mills generate all their own electric power demand.

The powerhouse turbo-generator furnishes electric power to the mill system. This is by-product power generated by the extraction steam quantities and power generated in a condensing cycle.

By-product generation is limited by process steam demand and plant boiler pressure. Total power demand in most cases exceeds the by-product generation volume. The balance is made up in a condensing cycle.

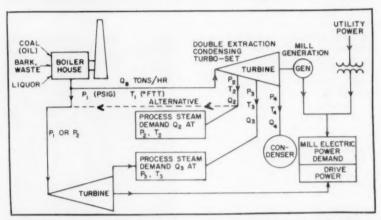


FIGURE 1—Steam and electric energy flow graph typical of an integrated kraft pulp and paper mill. Energy sources include: black liquor burning; gas, oil or coal burning; bark and chipper waste burning, and utility electric power.

Therefore, energy conversion efficiency and economical operation are of the utmost importance to over-all mill efficiency; by-product power is cheaper than power generated in a condensing cycle.

A mechanical drive turbine in an industrial plant is built as a back presssure unit for economical reasons. The turbine operates on steam, which could be otherwise utilized for byproduct generation, hence turbine efficiency is of great importance.

Drive turbine throttle pressure and back pressure are determined by mill layout. Turbine exhaust temperature may require installation of de-superheating equipment to conform to process steam requirements. This may also influence the lowest turbine back pressure that is permissible.

Exhaust pressure and temperature must comply with processs requirements. The steam quantity through the turbine is then determined by:

a. primary throttle steam conditions;

 b. horsepower rating of the turbine and its speed;

c. turbine efficiency.

The drive turbine exhausts process steam parallel to the powerhouse turbine.

Therefore: If the drive turbine is to be compared with an alternate electric drive, then the drive turbine

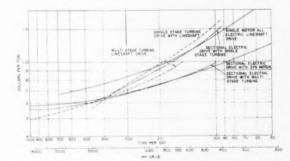


FIGURE 2: Full-Load Conditions—Combined cost (capital charges and fuel cost). These curves were calculated for 850 psia, 830°F total temperature at the boiler, 125 psig process pressure under FULL-LOAD conditions.

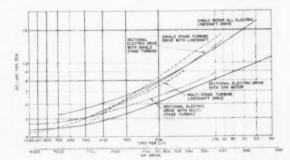


FIGURE 3: Half-Load Conditions—Combined cost (capital charges and fuel cost). These curves were calculated for 850 psia, 830°F total temperature at the boiler, 125 psig process pressure under HALF-LOAD conditions.

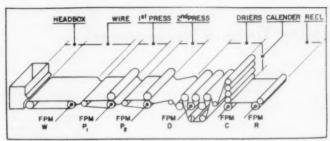
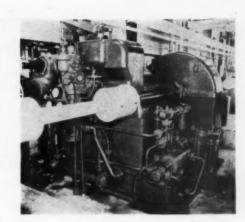


FIGURE 4 (above)—Typical paper machine (Fourdrinier) schematic shows break-down of sections.

FIGURE 5 (right)—Mechanical lineshaft turbine and reduction gear for differential gear lineshaft installation at back side of dryer section. Turbine, 1,850 hp; speed range, 6:1; rpm gear, 4,675/1,000; throttle, 575 psig 650°F total temperature—40 psig exhaust.



competes with the extraction turbine stage in the powerhouse for lowest steam rate power generation. Any deficiency in by-product power generation must be covered by additional generation in the condensing cycle of the powerhouse turbine.

The drive turbine performance, therefore, is an integral part of the total power conversion efficiency, and it is a false assumption to believe that the turbine efficiency is of no importance since "all the exhaust steam goes to the dryers," as is often quoted.

Turbine applications in general may be listed in the order of their efficiencies (listing highest efficiency first):

- a. constant speed, constant load;
- b. constant speed, variable load;c. variable speed, constant torque.

Concluding from this, it may be advantageous in many cases to drive auxiliaries (water pumps, vacuum pumps, etc.) by turbines rather than adjustable-speed drives as applied to paper machines. Large turbine drives

are efficient, however, if not operated too often in the reduced speed range.

Low first costs make turbine applications often very attractive, even with smaller and less efficient units.

Mill expansion programs sometime dictate turbine drive application because of the limited electric power capacity of the powerhouse or other heat balance considerations. Medium- and high-horsepower paper machine drives may be driven by a turbo-electric arrangement resulting in very low over-all cost, where over-all cost comprises capital and operational expenses. Such an installation combines drive efficiency and low equipment cost, which has been proven successful in many installations (see Figs. 2 and 3).

Problem at Hand: Fourdrinier Drive

The following parameters were assumed for developing the curves shown in Figs. 2 and 3. The problem chosen is a Fourdriner paper machine drive with regulated sections numbering between 10 and 14. The problem assumes new plant layout and does not include electric helper costs for lineshaft drives.

Electric energy demand
1050 kwhr per ton of paper
Steam demand
15,000 lbs. per ton of
paper at 125 psig

Capital return of base equipment	20	vears
Capital interest		4%
Maintenance charges		1%
Insurance and miscellaneous		1%
Capital return of excess		
investment	3	years

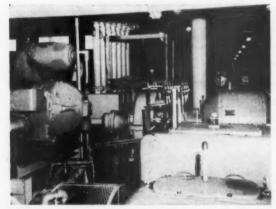


FIGURE 6—Electric helper drives as used with a differential gear lineshaft drive.

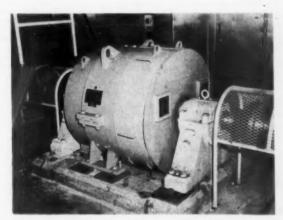


FIGURE 7—Helper generator coupled into a lineshaft drive.

Excess profit tax 50%
Installed drive, hp per rated tons of paper per day 4.26
Fuel cost \$0.30 per 106 Btu (Cost of equipment per fall 1957; capital charges based upon 320 working days

Prices for lineshaft drives in Figs. 2 and 3 are based on differential gear units. Cone pulley lineshaft drives as used today for smaller and lowerspeed machines have the advantage of lower capital cost, but the disadvantage of inaccuracies in speed and draw control.

Sections of Paper Machine

Fig. 4 gives the schematic of a typical conventional paper machine. The machine consists basically of:

wire section, press sections, dryer section, calender and reel.

If all sections are driven from a common lineshaft, the draw between the sections is introduced by means of cone pulley sectional indrives or by differential gears.

The lineshaft is driven either by a de motor or by a mechanical turbine. The turbine is often coupled into the middle of the lineshaft, in which case a double-ended turbine gear is re-

Lineshaft maximum design speed of modern machines in most cases is 1,000 rpm, which necessitates installation of suitable turbine reduction gear. Fig. 5 shows a typical multi-stage paper machine lineshaft turbine with reduction gear.

While the dryer steam rolls are commonly geared together, all auxiliary rolls in any one section of a paper machine are friction-driven from the driven rolls in the section. The torque to drive the auxiliary or presssure rolls in the sections is transmitted by the nip, or common felt or wire. The tensional forces in the felt cause stretching and change the moisture absorbent characteristic of the felt. The tendency today, therefore, is to apply helper drives within the wet end sections to lengthen felt and wire life and improve over-all machine performance (Fig. 6). These auxiliary drives are electric de motors supplied from one or more generators. These are generally built into the lineshaft if the lineshaft is turbinedriven. Fig. 7 shows such a helper generator coupled into a lineshaft. For turbine-driven machines, however, operated over a wider speed range the helper generators are often grouped into motor-generator sets independent of the lineshaft.

Horsepower Requirement

A full and detailed description of the paper machine is required in

Calculating Turbine Horsepower*

A kraft paper machine has the following characteristics:

Туре					 				0	0 0	0			0	0						v										For	urd	lri	nie	ar	
Machine Width .																																				
Productive Speed	R	a	n	ge							 																1	5() t	0	1,5	500) 1	pr	n	
Type of Paper																																				
Bearings																																				
Steam at Throttle					٠		٠													0						8	50		psi	g	83	10°	F	T	T	
Back Pressure																																				
Type of Drive						 		 																												
																				T	u	rb	in	e	0	0	uţ	ole	ed	in	to	lin	es	ha	ft	
Power Supply														2,	,3	0	0.	. ;	ar	nd	1	4,	40	10	-1	VO	lt.	. 6	3-1	oh.	ase	. 6	30	CT	DS	

Machine Sections

Macrane Sections	NRL	NRL Drier
Couch		
Wire Turning 30" dia.	.090	
#1 Wire Return 20" dia.		
#2 Wire Return 20" dia.]		
1st Press 34" dia.	.024	
2nd Press	.024	
Smoothing Press	.007	
	.007	0.0018×9
1st Dryer 60" dia. 9 Rolls		
2nd Dryer 60" dia. 9 Rolls		0.0018×9
Breaker Stack 30" dia.	.009	
2nd Dryer 60" dia. 20 Rolls		0.0018×20
Size Press 30" dia.	.020	
4th Dryer 60" dia. 11 Rolls		0.0018×11
1st Calender 32" dia. 8 Rolls	.056	
2nd Calender 32" dia. 8 Rolls	.056	
Reel 42" dia.	.008	
ACCI	.000	
Total	.294	0.0018×49

Turbine hp = $1.4 \times 15 \times 212$ (.294 + 49 × .0018) = 1,700-hp Turbine Rating

and Typical Specification

Steam Turbine Lineshaft Bill of Materials:

Specification provides one steam turbine drive unit as follows:

One 1,700-hp multistage impulse type non-condensing steam turbine designed to operate with normal steam conditions of 850 psig 830° FTT inlet, 50-psig exhaust.

The following features and accessories should be included:

Combined trip and throttle valve with steam strainer

Main speed governor for paper machine drive application, controlling speed within plus or minus 0.1% of maximum rated speed at any set speed

Separate emergency over-speed governor

Multiple automatic governor-controlled steam inlet valves

Separate emergency over-speed governor
Multiple automatic governor-controlled steam inlet valves
Hand-operated speed changer for 10:1 speed range
Motor-operated speed changer for 10:1 speed range
Complete pressure lubrication system including the following:
Separate motor-driven gear type main oil pump (electrical characteristics
3-phase, 60-cycle, 440-volt). Motor to be totally enclosed, fan-cooled
Separate auxiliay oil pump with automatic pressure regulator
Single tubular type oil cooler designed for 85'F fresh cooling water
Oil filter in high-pressure governor oil line
Oil reservoir

Oil reservoir

Oil piping connecting all parts of the turbine gear unit oiling system. Oil piping will be steel, 300 lbs., ASA Standard and will have welded or flanged connections 2-½" diameter oil pressure gauges for mounting on the

flanged connections 2-½" diameter oil pressure gauges for mounting on the oil piping

Low oil pressure trip mechanism

Solenoid trip device for remote tripping

Sentinel type warning valve

Heat insulating material with painted sheet steel jacket

One set of any special tools required for maintenance purposes

One 1,700-hp totally-enclosed, flexibly-coupled, single-reduction gear including Oil filter, by-pass type, in oil supply to gear spray nozzles

Flexible high-speed coupling

Double-ended gear shaft complete with extension shaft, solid coupling and pedestal bearing, grease-lubricated

One Steel baseplate on which the turbine and gear will be mounted, tested and shipped as a complete unit.

Note: The turbine could also be quoted as an alternative as a single-stage unit.

Note: The turbine could also be quoted as an alternative as a single-stage unit.

^{*}Refer to TAPPI Data Sheets 145-F, 145-G and 145-I

order to lay out the drive turbine adequately. The horsepower requirements for a mechanical drive turbine are calculated from TAPPI Data Sheets 145-F, 145-I and 145-G. It is evident that the layout of the paper machine has to be known in detail in order to read out any factors from these sheets, and to determine the total horsepower requirements of the drive.

A thorough study of the information given in these data sheets is indicated before calculating the horsepower rating of a particular paper machine turbine.

Past experience has shown that the rating of the turbine should cover at least the sum of all sectional normal running loads (NRL) at maximum rated speed and further include a safety factor of about 15% for transmission losses in the lineshaft and the

This method of selecting the turbine rating is also applicable if electric helper drives are used, and if these are supplied from lineshaft driven generators.

Writing this in algebraic form, a typical formula is:

 $\begin{array}{l} P = 1.15 \times S_m \times W \left[a + b \left(N_p + N_f \right) \right] \\ \times 10^{-a}, \text{ where} \\ P = \text{Nominal turbine horsepower} \\ \text{(minimum)} \end{array}$

(minimum)

S_m = Machine speed in fpm

W = Trim of machine in inches
a = Sum of all NRL factors except
dryers but including helperdriven rolls if supplied from lineshaft generators

shaft generators (In case helper drives are supplied from a separate m-g set, the NRL's of these drives should not be included.) b = NRL for paper dryers $N_p = \text{Number of paper dryers}$ $N_t = \text{Number of felt dryers}$

Severe operating conditions, such as poor condensate removal from the dryer section, resetting of nip pressures, etc., may result in a higher horsepower demand than calculated. To meet these overload requirements the turbine should be rated for 20% permanent overload capacity. Thus, the multiplier of 1.15 as given in the above formula has to be increased to read approximately 1.4.

Future speed-up, rebuilding or ex-

pansion of paper machine sections may also have a bearing on the turbine rating and may have to be considered when rating the turbine.

Above horsepower formula is typical and shows that the horsepower of the paper machine varies linearly with speed. A paper machine drive, therefore, is in general a constant torque drive at variable speed. Exceptions, such as sleeve bearing dryers and low-speed operation, are listed in the TAPPI Data Sheet 145-G, 145-I.

Turbine Governor

Adjustable speed is required in order to produce different grades of paper, and the speed range must be known (2-to-1 up to 6-to-1 speed ranges in most cases are normal, although a 10-to-1 speed range is not uncommon).

A sensitive and fast-acting turbine governor is required to hold the turbine steady-state speed within the usually required 1/10 of 1% of base speed, an accuracy as required in most cases today.

Tariffs on Pulp in 6 European Nations

As the GATT sessions in Geneva, aiming to lower tariffs in Europe, especially, is in full swing, and tariff talks continue in the European economic associations of nations, it is interesting to review the actual tariffs now in existence for pulps. PULP & PAPER's Zurich office has obtained this information from six countries on the Continent:

SWITZERLAND

	Tariff:	100 kg gross
Sulfate unbleached	4701.31	Fr. 4
Other than unbleached sulfate Sulfate bleached (also pre-	4701.32	Fr. 5.—
bleached or semi-bleached): By proving that it is only		
used for artificial fiber	4701.34	Fr. 1
Other than bleached sulfate	4701.36	Fr 7

Cellulose of the above indicated tariffs in reels, sheets or boards has to be perforated before being imported, so that it cannot be used as paper or board. Unperforated cellulose is subject to customs duty.

GERMANY

	Tariff:	Duty:
Sulfite unbleached	47.01 B-2-b-1-b	5% of the value
Sulfite bleached	47.01 B-2-b-2-c	4% of the value
Sulfate unbleached	47.01 B-2-b-1-a	6% of the value
Sulfate semi-bleached	47.01 B-2-b-2-a	duty free
Sulfate bleached	47.01 B-2-b-2-a	duty free

Pre-bleached or semi-bleached pulp is considered as bleached pulp, as far as customs duty is concerned.

To the United States special duty taxes are granted. Besides the duty a turn-over tax of 4% of the value has to be paid-also for the duty free material. This tax is calculated according to the value of the goods plus the additional amount for the duty. This duty information is without any obligation.

HOLLAND

No duty has to be paid, only a turn-over tax of 5%.

	Tariff:	Duty:
Mechanical pulp	47.01	20% + 5% import tax
Pulp unbleached	47.01	17% + 5% import tax
Pulp bleached	47.01	20% + 5% import tax

There are value duties, whereby the import taxes are calculated according to the calculation value plus the duty fee, i.e. that the whole amount represents at a duty of 20% and an import tax of 5%, 26% of the value of the goods.

These tariffs are valid for the import of pulp from all countries due to the fact that the Spanish duty tariff does not make any difference between countries of EEC, EFTA or North American countries.

For all qualities of pulp, a duty of 6% has to be paid.

For all qualities of pulp no duty has to be paid.

Improved Pulp Chlorination

... is definitely possible through information at hand plus a fresh engineering approach to stage equipment design

Part II-Equipment Design

By E. PAUL DUNCAN*
Technical Service Supervisor
Western Chemical Div.
Hooker Chemical Corp.

and

DR. W. H. RAPSON Consultant

• Quality losses take place in the chlorination stage at many mills. Corrective action is necessary. Redox control is one step toward minimizing strength losses and improving pulp chlorination. However, the key to both is in equipment design to achieve (1) optimum mixing, (2) minimum channeling and (3) variable retention times.

Accomplishing these objectives requires a fresh approach and application of fundamental chemical engineering principles.

Optimum Mixing

Because of the extremely fast reaction rate with the lignin compounds and slow rate with the carbohydrates, it is obvious that every means should be taken to make all the lignin accessible to the chlorine quickly, and then to stop the reaction so that oxidation is minimized. This requires intimate, thorough mixing of all the chlorine with all the pulp fibers over the entire critical reaction period for the lignins -3 to 5 mins. This presents a critical engineering problem, but two steps have already been taken in this direction. These are the Hooker water injection system for chlorine introduction and the Hooker stock line chlorine-pulp mixers.6

Water Injection

Proper application of the principle of dispersing gas into small bubbles by a water jet should speed the uniform solution of chlorine into water, resulting in more rapid and uniform reaction with the pulp. However, it was not until recently, with the development of improved automatic control

equipment and high-strength corrosion-resistant materials, that it has been possible to design a system that offers a high degree of dependability and safety under present operating conditions. In modern bleach plants—with high production rates, high chlorine flows and relatively high pressures—our field studies indicated that suitable injectors were not available. It was necessary to make a complete engineering study to design and test a completely new injector specifically for chlorine injection into pulp.

This new injector is made of Hetron 72 corrosion-and-fire-resistant polyester, reinforced with fiberglass.

Hooker-developed ball checks are vital part of the injection system. This check valve must operate under the extreme conditions of wet and dry chlorine high-pressure and possible stock fiber fouling. Until development of the automatic hypochlorite systems, a suitable, dependable check valve was not available even for chlorine service. Now these check valves in hypochlorite service have an excellent record of continuous operation over several years in many pulp mills. A back-up of high-pressure alkali has never been experienced in these installations. This same type valve in a larger size is recommended for preventing possible water back-ups into the chlorine system in the water injection system. Fouling by stock fibers is always possible; therefore, two valves in series are recommended.

Several important features of the water injection system should be emphasized.8 It is generally known that water injection of chlorine gas is potentially dangerous. Several unfortunate and costly experiences in the form of water back-ups into the chlorine system or chlorine back-ups into the mill water systems have resulted in some past attempts at water injection. Because of this, the method will not be recommended unless the proven chlorine double-check valves, automatic stop valves, water check valves and separate high-pressure water supply pumos are incorporated in the system. An isolation valve and alternate point for normal chlorine gas injection permit continued production during any maintenance required on the water injection system.

Chlorine-Pulp Mixing

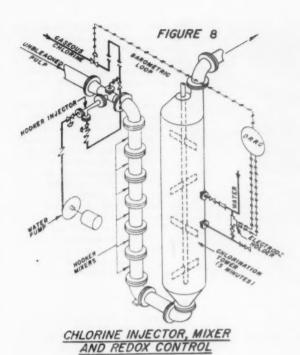
The fact that a proper water injection system now permits the feed of a uniform solution of chlorine into the stock line gives no assurance of uniform reaction with all the pulp fibers. As the chlorine solution enters the moving pulp mass, flowing in a pseudo-laminar fashion at 2 to 4 ft. per sec., further dilution takes place. It is important that turbulent stock line mixing be provided to distribute the chlorine solution uniformly, and to break up the fiber bundles so that the chlorine can contact each individual fiber. Without this mixing, over- and under-chlorination will result.

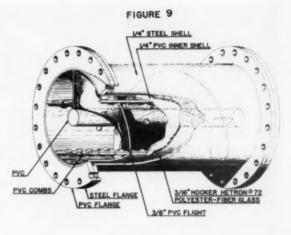
Ideally, continuous turbulent stock line mixing should be applied for 3 to 5 min., but this would require excessive power for mixers throughout a stock line some 400 ft. long. It was found that significant improvement in operation is possible by installing three to six mixers prior to the retention tower. This at least assures uniform solution strength prior to the tower. The pressure drop per unit is about 2 lbs., and the units are available up to 22 in. in diameter. These are in service in numerous sulfite and kraft mills, some having been in continuous service since 1936.

Several years ago Hooker was requested to supply these same mixer baffles made of welded PVC to reduce costs. The first units failed structurally. Engineering and design work was continued, with each new design better than the previous, leading to the present standardized unit shown in Fig. 9. This design has withstood rugged mill service for more than two years with no sign of failure.

It is significant that field work with the mixers has turned up results that continuous mixing over several minutes is essential to the goal of improving pulp chlorination. Here again, continuous records and correlations achieved only with redox measurement made it possible to get dependable information. In each case, the

^{*}Presented at a meeting, Paper Industry Management Assn., Pacific Coast div., Seattle, Wash.





TORNAGE	DIAMETER	REMARKS								
90	12"	MINIMUM KRAFT - 6								
120	14"	MIXERS REQUIRED SULFITE - 3								
200	16"	AP - APPROXIMATELY 2-LBS TO 3-LBS PER MIXER								
300	10"	OA LENGTH OF EACH MIXER - 3'-0"								
400	20"	MAXIMUM TEMPERATURE = 140°F								
500	22*	STOCK CONSISTENCY - 3-346%								

more mixers that were installed, whether mechanical or stationary, the better the results. In fact, in one case, six Hooker mixers were not quite sufficient to give a representative sample for redox control, but the operation of a previously installed mechanical mixer gave just enough additional mixing and time to make redox control possible.

Tower Channeling

Channeling of 3 to 4% stock in chlorination towers is a serious problem. It is present in practically all towers, but the reasons are not always obvious. Undissolved chlorine gas entering the tower will understandably cause channeling. But, in mills with sufficient pre-mixing to put all the chlorine into solution channeling is also evident. Many factors might be responsible, such as velocity gradients; differences in densities of over-chlorinated and under-chlorinated pulp fibers; minute, but significant, local dewatering of stock; directional flow gradients. and carbon dioxide evolution from over-chlorinated fibers undergoing oxidation. The specific reasons are not known, but it is a fact that in some of the modern large bleach plants, with the latest chlorination tower designs for 60-min. retention, some stock is going through in 10 min. This has been proved with tracers. It is also known that channeling takes place in the small 6-ft. diameter, 5-min. Hooker two-phase chlorination reactors as evidenced by interior corrosion and flow etching.

No solution is at hand to prevent tower channeling in existing plants; or by any new tower design presently available. However, the effects of any tower channeling can be minimized by providing 3 to 5 min. of thorough mixing prior to entry into the retention tower. As shown by previous data, 70 to 90% of the applied chlorine can be uniformly consumed in this time.

As one possible solution, the relatively inexpensive system design shown previously⁸ is offered for all chlorination stages. This incorporates water injection, stock line mixing and a modified upflow Hooker 5-min. reactor. This 5-min. reactor should have a high ratio of height to diameter to provide a high head for keeping the chlorine in solution, and to maintain a uniform velocity gradient. The tower should be equipped with numerous counter-rotating mixer impellers. Engineering studies are now underway to determine the optimum gradient and impeller speeds for the difficult task of forcing turbulent action in the sluggish pulp suspension. The object is to break up the fiber bundles without breaking the pulp fibers or creating a dewatering action that might result in channeling.

Most, if not all, of the critical lignin chlorination should be completed in this over-all 5-min. treatment, which is henceforth referred to as the "5-min. design." Subsequent handling of the chlorinated stock requires careful consideration of the factors presented at the start of this paper (see October PULP & PAPER, pages 100-103), relating to optimum retention time and temperature for minimum strength losses in the chlorination stage.

Variable Retention Chlorination

Assuming that the "5-min. design" is incorporated, the subsequent time and temperature combination chosen for pulp chlorination in a given mill is an arbitrary compromise to get the best chlorination of lignin with minimum attack on the cellulose and hemicellulose. It is found experimentally that at 20°C and 31/2 consistency. about 40 min. is optimum for kraft pulp. Assuming as a rough approximation that all chemical reactions are doubled in rate for every 10°C rise in temperature, it follows that to maintain optimum conditions, time allowed for chlorination should approximate the following:

Temperature, °C	Time, Min						
5	120						
10	80						
20	40						
30	20						
40	10						

To apply this concept requires a new approach to chlorination tower design, since in most mills a single upflow tower gives a fixed time for a given pulp production rate at constant consistency. Several stage designs could be used to make available three or four retention times to compensate

for winter and summer temperature variations and variations in production

Fig. 10 shows several possible stage designs. In each case, the initial "5min, design" is considered essential for reasons previously outlined. With this initial treatment, it is assured that all chlorine is dissolved, and that the uniform solution is in intimate contact with all pulp fibers. Gassing off should not take place, and channeling in subsequent equipment should have a minimum effect on the over-all stage efficiency

The first design is upflow-downflow, permitting variation from a minimum of 60 min. in the combination.

The second design is upflow-upflow, permitting three fixed times of 15, 30 and 45 min. By using three upflow towers of different sizes, seven fixed retention times would be possible.

The third design is a single upflow tower with fixed retention times of 15, 30, 45 and 60 min. It might be possible also, and very advantageous, to build an unflow tower with a floating. adjustable launder to permit complete variation in time over the entire tower from 10 to 60 min.

Any of these proposed arrangements would make it possible to shorten chlorination time as the temperature increased, and to obtain a more nearly constant degree of chlorination with minimum pulp damage throughout the year.

Another advantage inherent in any of these systems is that retention time could be kept more nearly constant when the pulp throughput rate is changed. The lack of flexibility in this respect is a serious problem when production rate is altered in many mills.

Conclusions

Experimental results show that strength losses and color reversion can take place in the chlorination stage if optimum conditions of temperature, retention time and mixing are not carefully considered. In mills using only chlorine dioxide for bleaching, the principal reason for any pulp degradation through the bleach plant probably can more often be traced didectly to the chlorination stage.

To minimize quality losses in the chlorination stage, it is necessary to re-design equipment so that retention time can be varied from about 15 min. to 60 min. or more to compensate for the effect of temperature on the reaction rate. It is also necessary to provide initial continuous, turbulent mixing over a period of 3 to 5 min. Toward this end, a "5-min, design" is offered, including improved water injection of chlorine, improved stock line mixers and a 5-min, tower with tur-

FIGURE ID 10 - 60 MINUTE 15-45 MINUTE 15-60 MINUTE

bulent agitation. For subsequent retention, several multiple tower arrangements are suggested to permit control of retention time for winter and summer operation.

Redox control of chlorination is also ssential to minimize under- or overchlorination, both of which can result in economy and quality losses. Proper installation of the redox control system is of paramount importance because, once incorporated, the operation of the entire bleach plant is dependent on optimum operation of the automatically-controlled chlorination stage.

Improved pulp chlorination is definitely possible through information at hand plus a fresh engineering approach to the stage equipment design. Through optimum mixing, automatic redox control, and variable retention times the tools necessary to approach the goal of leveling out brown stock variations in the primary chlorination stage are at hand. A constant, low optimum caustic-extracted KAPPA number should result. Fixed conditions, resulting in optimum economy. uniform quality and ease of operation in the remaining stages of the bleach plant, might then become a reality.

References

6. Hooker Technical Service Bulletin,

6. Hooker Technical Service Bulletin, "Chlorine-Water Injection System for Pulp Chlorination", April 17, 1959.

7. Duncan, E. P. "Significant Chemical Savings", PULP & PAPER 33, No. 9, (84-85), August 1959.

8. Fig. 8 appeared in Part I of this two-part article. See PULP & PAPER, October 1960, pages 100-103.

Steel Fittings Boost Coating Efficiency

Stainless steel fittings in the pipe line installation of a new coating plant have saved approximately 20% in labor costs and time, cut the number of normally necessary welds by 50%, provided a smoother flow through the line and guaranteed a big New England paper mill a long-life, troublefree operation.

The new coating preparation plant started up in the Fall of 1958. In this operation dry clay is mixed with water into a slurry and pumped through the stainless steel lines to weighing hoppers, where various amounts of clay, starch and additives are measured out and dropped into the mixing tank. The entire preparation is then mixed and heated. The mixture is pumped either to the mill or to holding tanks.

Speedline fittings supplied by Horace T. Potts Co. were used throughout the installation. According to the project engineer, a feature of these units is a tangential characteristic that eliminates the need to weld an additional piece to the curved fittings, thus saving material and cutting the number of required welds by 50%. This assures a smoother flow because in any given number of welds a certain percentage will penetrate too deeply, causing an interior roughage. Cutting the number of welds automatically reduces such roughage.

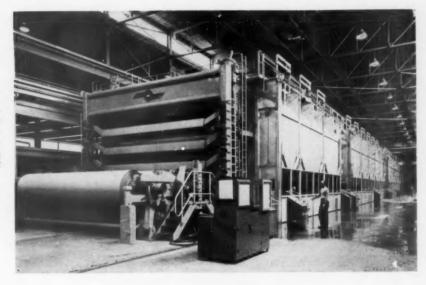
This characteristic, he explains further, resulted in an installation saving of at least 20% in labor costs. And it also resulted in a better alignment, because, obviously, the fewer the parts, the better the alignment.

Stainless steel fittings were chosen because of the obvious importance of purity in the coating mixture. The slightest impurity would ruin the entire batch. That's why at the very outset the mill discarded any fittings susceptible to rust, flaking or chemical reaction. The pH content of the coating is low but had to be considered. The mill, for example, could not even begin to consider black iron mild steel, according to the project engineer.

In addition, he explains, stainless doesn't expand under pressure or heat; and considering that the mixture will intermittently reach temperatures as high as 230° F., it was obvious that the mill couldn't afford the slightest gamble.

The new installation used more than \$10,000 worth of fittings; over a thousand separate fittings in a line totaling more than 2,000 ft.

CONVENIENT INSPEC-TION OF DRAWS without opening Ross-Hooper totally enclosed hood is provided by 4-ft. high Herculite windows which run the full length of the hood.



Air Systems Help Union Bag-Camp

Importance of air to dryer operations and machine room conditioning are stressed plus their contribution to good machine performance

• The air system for Union Bag-Camp Corp's. new No. 7 machine in Savannah, Georgia, performs nine different functions, all essential to high speed, economic paper production, and to satisfactory machine-room temperature and humidity.

The overall system, supplied by the J.O. Ross Engineering Division of the Midland-Ross Corp., comprises a number of independent units, each designed for a specific task. These units are:

1. A totally enclosed paper machine hood and exhaust unit. 2. Three bottom-felt drying units. 3. Two roof-heating and ventilating units. 4. Two wet end exhaust units. 5. Two "Dryjector" units. 6. Two air make up units. 7. A calender cooling unit. 8. Units for cooling electrical equipment. 9. A trim conveying unit.

Enclosed Hood and Exhaust System

The most impressive of the air system units is the Ross-Hooper hood which totally encloses the dryer portion of the machine. The three-section hood allows space for a breaker stack and size press between first and second and second and third sections. The hood is made of pairs of aluminum panels, each encasing an insulation

liner. Roof panels, which are heavily insulated to prevent condensation, have 3 in thick mineral wool liners. Panels along the drive side of the machine are mounted on tracks at the eave of the hood and slide back and forth to allow access to the machine.

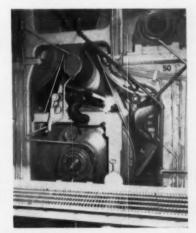
Front panels lift vertically and expose the entire side of the machine within six seconds in case of a web break. Panels also may be raised in sections to expose only a portion of the machine. Panels are raised by attached cables that wind around roofmounted drums when the lifting motors are operated.

The ends of the hood sections are enclosed with fixed panels provided with personnel doors and openings for the web to pass through.

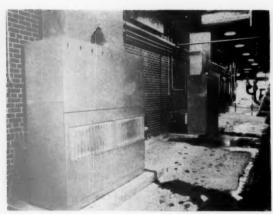
Air is exhausted from beneath the hood by five fans, two for the first hood section, two for the second and one for the third. The fan intakes are connected to plenum chambers which run along the inside of the hood sections, at the top and along the drive side. The plenums are open to the inside of the hood sections for their full lengths to allow uniform withdrawal of moisture-laden air. The fans exhaust to atmosphere via Transite ducts extending through the roof.

Bottom Felt Drying Units

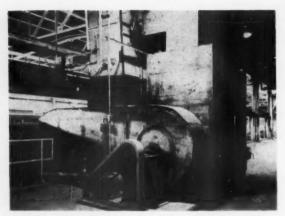
No. 7 machine has three Ross felt drying units which supply heated air to the bottom felts. An insulated fan discharges heated air through a horizontal duct to a downward vertical one which distributes it to Ross high velocity vapor absorption nczzles across the width of the felt.



DRYJECTORS VENTILATE POCK-ETS formed by sheet, paper and felt rolls.



TEN-TON COOLING UNITS CONDITION electrical apparatus. They are mounted outside room housing electrical controls and an MG set.



FELTS ARE DRIED by one of three units shown here. Insulated fan in foreground discharges air through horizontal duct to downward vertical duct which distributes to high velocity vapor absorption nozzles across felt width.

Air to the heater section is supplied both from the outside, and from the Ross-Hooper hood exhaust. The ratio of exhaust air to outside air is automatically regulated by dew point controls in the hood exhaust duct. When the machine is running at less than rated speed, and the moisture content of the exhaust air is relatively low, the dew point control operates a damper which permits more of the exhaust air to be recirculated.

At higher operating speeds, the moisture content of the exhaust air is greater, and the damper partially closes, decreasing the amount of recirculated air and increasing the amount of air from the outside.

When the moisture content is low, it is, of course desirable to recirculate and use the heat content of the exhaust air. When the moisture content is high, recirculation must be minimized since the air would have little capacity to carry off additional moisture. The air is heated by steam coils, stainless steel tubes being used for long life and a minimum of maintenance.

Roof Heating and Ventilating

The machine room has two Ross roof heating and ventilating units, one for each end of the room, to prevent moisture from condensing on the ceiling and supporting structural members.

The two wet-end exhaust units comprise enclosed fans located on the roof above the wet end of the machine. Vapors are drawn up through the roof outlet, minimizing the amount which spills into the machine room.

Dryjector Units

The two Ross "Dryjector" units provide ventilation for the vapor pock-

ets formed by the sheet, dryer and felt rolls. A complete unit consists of circulating fan, air heater, distribution ductwork and connections to machine doctor-backs. A riser from the header at the front side of the machine connects with a segment of the machine frame which was supplied hollow by the machine builder (Beloit), to conduct the airflow. Provisions were also made for the damper connection in constructing the machine

A flexible hose connects the hollow frame to the doctor back which carries the air to an outlet at the center of the machine. This air plus that from a similar arrangement at the opposite side of the machine continuously ventilates the pocket formed by the sheet, dryer and felt rolls. Alternate pockets are ventilated by tubes extending toward the center of the machine from each side. Much credit for the uniform moisture profile across the sheet is given to the Dryjector units.

Air Make-Up Units

Air exhausted from the room by the hood exhaust fans and the wet end exhaust units exceeds that supplied by the felt dryer system, roof heating and ventilating units, Dryjector and other units. Therefore, additional air must be supplied to balance the air to the machine room. This is done by two air make-up units, one for each end of the room.

Union Bag-Camp uses a calender cooling unit at the calender stack following the dryer. This Ross unit blows air onto the bottom calender roll through a series of nozzles adjacent to the roll. Air is controlled at each individual nozzle by a butterfly valve.

Cooling Electrical Equipment

Five electrical control rooms are cooled and ventilated to maintain optimum conditions for operation of electrical equipment. Two packaged 10-ton cooling units are mounted outside a room housing electrical controls and an MG set. The room is maintained under slight positive pressure by the introduction of charcoal filtered fresh air. This prevents possible infiltration of corrosive elements which attack commutators and contacts and necessitate periodic cleaning and replacement.

One more unit incorporated in the No. 7 machine's overall air system is a trim conveyor. Edge trim is directed into a duct and is pneumatically conveyed back to the broke pulper for reprocessing.

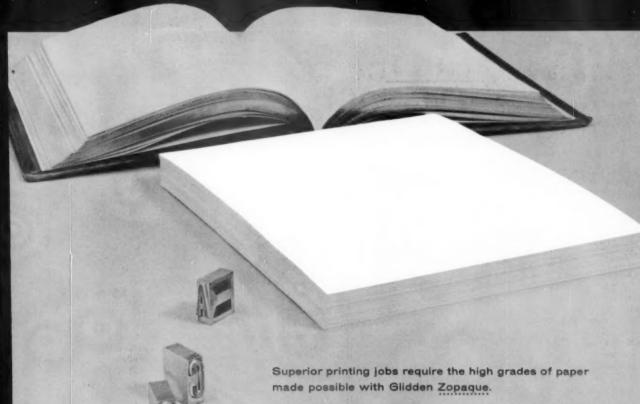
Puget Sound Pulp Measures Radio Activity

Puget Sound Pulp & Timber Co. now monitors air and water daily at its Bellingham, Wash. plant to measure the radio-active content of each. This program, undertaken late last year, is to ensure against excess radio activity of pulp made for photographic uses. Daily monitoring enables the mill to select periods of low radio activity for producing such pulp.

Radiation resulting from atomic fallout is the type of most industrial concern and only the beta radiation is counted in the testing program. Participants on this work report that the level of radiation in the area is normal and state a person wearing a luminousdial watch is exposed to considerably higher radiation from that source than from cosmic rays or bomb fallout.

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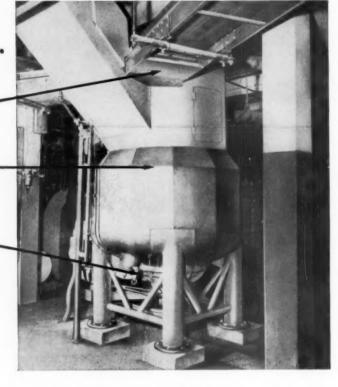
To Pulper___

To Pump*

To Pulp Mill

With the Impco Solvo_® Pulper

The Model 2U Solvo Pulper, playing a dual roll at Bird & Son, Inc., East Walpole, Massachusetts, has sharply reduced previous material handling costs. It is operating continuously under automatic control as both a material handler and a pulper. Boxboard broke from the converting machines is delivered by conveyors to the Solvo which simultaneously pulps and pumps it to the pulp mill. The any capacity requirement. units' single 50 HP motor handles both pulping



and pump-away demand at a 24 ton/day rate.

This is one of a wide variety of Solvo Pulper applications. Others include de-ink cooking, dry end broke handling, paper machine furnish pulping, transfer of high yield cooked chips to refiners as well as the normal pulping of broke, wet strength and waste paper. Units are available for

*The pulping element, extractor plate and stock pump are one rotating assembly.



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Fifth World Forestry Congress:

Improving The World's Forests

International cooperation in proper development and use of world's forest resources espoused by foresters from 65 lands

By LOUIS H. BLACKERBY Western Editor PULP & PAPER

• The most significant development that may come out of the Fifth World Forestry Congress held at Seattle, Wash., August 29-September 10, is the prospective establishment of seed certification standards and organization to administer the actual work. This is a subject of concern in every forest-growing nation of the world but it may not be either recognized or appreciated. Any nation with poor trees is a potential purchaser of good species. Nations with good trees are potential suppliers of seed to the havenot countries.

There has been considerable production of exotic species in the various parts of the world. Some have been extremely successful such as in

Australia and New Zealand and there have been complete failures. The principal difference between good and poor results is apparently a matter of selecting seed which is grown under conditions suitable to the area in which it is to be planted.

Although this subject is not new, we have not heard much about it but I'm convinced we're going to hear much more about it in the future.

Unless you were there it is difficult to imagine the heterogeneity of some 2,000 foresters drawn from 65 nations around the globe united on one common front: growing better trees. This meeting has been called the largest international gathering of foresters yet held and it definitely provided opportunities for people of all lands to compare notes about each other's operations and at the same time it allowed them to examine at first hand



LOUIS H. BLACKERBY, Western editor of PULP & PAPER, is a graduate forester and brings his considerable experience in forestry and wood products industries to this report on the World Forestry Congress.

the forests of America. The Congress also placed increased responsibilities on the pulp and paper industry in regard to global use of wood and better living standards.

From many countries came reports of forests comprised largely of species not suited to manufacture into products other than fibrous materials. Even those with abundant structural type species indicated ambitions and anticipations for increasing forest yields through utilization of forest and mill residuals. With but few exceptions pulp-paper was considered to be the "savior industry" for achieving objectives.

The industry will inevitably take a strategic role in "multiple use of forests," the conference theme, which was emphasized by Dr. Richard E. McArdle, congress president and chief

World Forestry Congress Objectives and Officers

The Fifth World Forestry Congress, held at Seattle, Wash. and hosted by the U.S. Government, was the first such meeting to be held in the Western Hemisphere. Previous World Forestry Congresses were at Rome, Italy (1926), Budapest, Hungary (1936), Helsinki, Finland (1949), Dehra Dun, India (1954).

The objectives of the recently concluded session were to: Advance the science and practice of forestry through exchange of information; develop personal association among professionals of forestry throughout the world; stimulate and foster international cooperation in the proper development and use of world forest

Officers of 5th World Forestry Congress:

Honorary Presidents-Eino Saari, Finland, and C. R. Ranganathan, India;

President-Richard E. McArdle, U.S.A.;

Co-President-John D. B. Harrison, Canada; Enrique Beltran, Mexico;

Vice Presidents—Walter Mann, Germany; Hitoshi Yamasaki, Japan; Erik Wilhelm Hojer, Sweden; The Earl of Radnor, United Kingdom; Anatole Borisovich Zhukov, Union of Soviet Socialist Republics.

WORLD FORESTRY CONGRESS ... need for multiple forest use

of U.S. Forest Service, Washington, D. C.

He called attention to increased competition of land uses throughout the world and stated this "will increase as world population increases." As people become city dwellers they lose sight of their dependence on natural resources, most of which comes from the land, he said.

Foresters, trained to take a long look ahead, understand the dependence on land and that "our stewardship of a large part of the earth's surface imposes upon us great responsibility to obtain great productivity of these lands for the benefit of our fellow man." This is why, Dr. McArdle stated, "we foresters of many nations propose to dedicate our discussions at this conference to sharing our knowledge and experience so that we may improve policies and practices relating to wide use of forest lands."

Concerning new developments, he noted the rapidly growing awareness for multiple-use management. "This comes not only from the obvious need to make forest lands more fully useful to the people but also to lessen the pressures to divert forest lands from a combination of uses to one exclusive use. In most instances forest land is not fully serving the people if used exclusively for a purpose which could also be achieved in combination with several other uses."

V. S. Rao, inspector general, Indian Forest Service, New Delhi, India, at the opening general session, said forests are "of such great importance in the life of man in the tropics that it is difficult to find a situation where he can do without forests altogether or where the re-establishment of forests will not vastly improve his environment and provide a number of amenities, the absence of which makes his life poorer physically and spiritually."

The Russian view on forest policy was presented in the general session

by P. Vasiliev, Academy Sciences, U.S.S.R. "The forestry legislation of any country, as a documentary expression of its forestry policy, is relatively easy to study and systematize. However, economists, historians and lawyers have done very little of late in studying forestry legislation on an international scale. If such work was done the states could borrow from each other much more useful experience than is being done today."

Genetics and Tree Improvement

Methods For Improving Trees

Authorities from various world regions expressed profound convictions of immense opportunities for improving forests through genetics, and advanced plans and suggestions for expediting this objective.

Foresters already have "greatly improved growth conditions for trees through planting, determination of proportion of different tree species to be used, thinnings, etc., but this is no reason to ignore the possibilities offered by genetics to improve forest trees." The speaker, C. Syrach Larsen, director Arboretet, Horsholm, Denmark, said "the necessary living material for raising one hectare of mature forest is a quantity of seed not larger than can be held in two hands. . . . One can hardly find any other industry where so small a 'cog' plays so

important a part in so large a produc-

The world-wide contribution to forestry by exotic species was presented by J. M. Fielding, Forestry & Timber Bureau, Canberra, Australia. Probably without exception, all countries practicing forestry grow exotic trees either commercially or experimentally. The forestry of some countries is founded on exotics almost exclusively. Among these are South Africa (where some 3 million acres of exotic plantations are expected by 1980), South Australia (where practically all timber produced is from exotic pine forests), Chile (where large portions of total production in the future will be from planted forests), and Denmark.

Exotic trees are often preferred to native species, and have proven especially valuable, in regions that lack native woods suited to the objective involved, where exotics have already proven more successful than native species, and in areas where silvicultural characteristics of forest species are not well-known.

Mr. Fielding proposed that study be undertaken, under FAO sponsorship, for establishing (1) an information section to coordinate facts on forest trees of known or potential use as exotics, and (2) tree seed collection centers, suggesting that the first of these be located in Mexico.



FORESTRY COMMITTEE MEMBERS of Pacific Science Assn. convene in Seattle, Wash. at 5th World Forestry Congress to discuss forthcoming 10th Pacific Science Congress to be held at Honolulu. (I to r) N. K. Carlson, Bishop Institute, Honolulu, Ha., Prof. S. K. Hyun, National Univ., Seoul, Korea, R. Keith Arnold, Pacific Southwest Forest Experiment Station, Berkeley, Calif., Chmn. L. W. Bryan, deputy state forester, Hilo, Ha., J. Herbert Stone, regional forester, U.S. Forest Service, Portland, Ore., Prof. J. A. Zivnuska, School of Forestry, U. of Calif., Berkeley, A. P. Thomson, conservator of forests, New Zealand Forest Service, Rotorua, N.Z., H. R. Josephson, director of economics research. U.S. Forest Service, Washington, D.C.

Need For Tree Seed Certification

What is required for successful utilization of tree seed and what can happen when these factors are circumvented was revealed by Leo A. Isaac. Widely known authority on this subject, Mr. Isaac was affiliated with Pacific Northwest Forest & Range Experiment Station, Portland, Ore., U.S.A., prior to retirement and since then served two years as FAO forester in Turkey.

Where tree seed has been correctly selected in accordance with factors

under which it was to be grown, the way of life of whole countries has been improved, he stated. In some cases this involved improving existing forests, in others, whole new forests were established.

The basic criterion is getting the right seed for the specific purposes and conditions involved. There are many forests, grown from purchased seed, which are complete failures. These sub-standard trees resulted from "using the wrong seed" for the area concerned, stated Mr. Isaac.

To facilitate obtaining forest seed adapted to the precise area in which it is to be grown, he proposed establishing an independent seed certification authority. This would be a non-profit organization sponsored by buyers and sellers of tree seed, and various agencies and associations concerned with forestry and tree improvement. For a beginning he suggests setting up such a certification service in Western North America.

Exchange Clearing Agency

Giacomo Piccarolo, director, Instituto Nazionale per Piante da Legno, Turin, Italy, suggested means by which plant breeding materials can be exchanged to eliminate present obstacles to developing better forests. He considered two types of exchange—one through a clearing house, the other directly between qualified institutions. The ideas were advanced on the bases of first setting up an exchange for scientific research and experimentation purposes rather than for large-scale cultivation material.

New species of fast growing trees have been produced in the Soviet Union by "a method of interspecific hybridization," according to S. S. Pyatnitskiy, dean, forestry faculty, Kharkov Agricultural Institute. He said "special research in genetics is conducted in different regions of our country. The best trees are used and seeds are exchanged to produce special species . . . for fast growth."

CONGRESS DELEGATES



G. Aguilar, director tecnico de la United Industrial de Explotacion Forestal, San Rafael, Mexico, reports his country has promising future regarding forest products industries, especially pulp-paper. However, he says, many forest zones are inoperable because of insufficient roads.



C. R. Ranganathan, presided at Fourth World Forestry Congress as president, the retired inspector gen. of India's forests, he predicts great expansion of pulp-paper production and consumption in that country. By end of third 5-yr. plan (starting next March) he expects India to be producing over 500 thousand tons of paper products annually. He is now exec. dir. of The Fertilizer Assn. of India with headquarters at New Delhi.



Philippine industrialist Florencio Tamesis, gen. mgr. of Associated Pulp & Paper Co. and other forest products-timber organizations headquartered in Manila, anticipates neutral sulfite pulp mill of 100-ton/day within 1 to 5 years and a paper mill later. He expects Albizzia pelcata, a leguminous tree now being planted by his organization at rate of 400 ha/yr., as prime pulpwood source grown on 15-yr. rotation. He reported presently harvesting second rotation Albizzia for producing hardboard.

Silviculture

Silvicultural Influence on Price

Government controls were pointed out as factors restraining forestry and forest economy in some countries. An example of this was voiced by Alex R. Entrican, director of forestry for New Zealand. Without questioning the general desirability of war-time economic stabilization, he said "a more liberal attitude could well have been taken" by government and price control authorities concerning the original base prices and subsequent price rises of stumpage. Price controls were influential in limiting the administration of silvicultural benefits in New Zealand. As controls have relaxed and profits increased, private owners have increased their silvicultural activities,

he stated.
"Had it been possible to apply correct silviculture when it was required," stated Mr. Entrican, "not only would the instance of insect and fungal attack in the exotic forest been trifling but the substituting of exotics for indigenous timbers would have occurred automatically through preference of the wood user for the easy drying, treating and working qualities of the defect-free or defect-rare grades yielded by tended stands of general purpose exotic softwoods. It follows that the exotic grower would have received a very much higher stumpage encouraging him to expand his resource and still further intensify his silviculture."

As to wood utilization industries, Mr. Entrican stated, "the strength of pulp-paper industry in particular, and of distintegrated products in general, in the world forest products economy is largely due to the fact that a significantly large proportion of its raw material is secured as a low value residue from both forest and sawmilling operations which carry by far the greater part of the cost of both growing and conversion. Had chemical utilization to carry its full share of growing and conversion costs, its competitive power in the world economy would be significantly lowered. Slowly but surely however it is being forced to make a greater contribution to both growing and converting costs. Concurrently the premium on high grade over low grade lumber is increasing and as the high quality virgin softwood resources disappear so will this premium increase.'

That these factors apply in other parts of the world was borne out in a paper by Prof. Thorsten Streyffert, dean of Royal School of Forestry, Stockholm, Sweden. He said "only when the stumpage value is high enough can the forest be cut irrespective of species and tree sizes in the way best suited to promote silviculture, i.e., to bring about a sustained yield which takes advantage of the productive capacity of forest site in the most economic manner. The cost of establishing and tending the new stands must be met from the stumpage value obtained in felling.

"In evaluating the amount to invest in growing future stumpage, evalua-

WORLD FORESTRY CONGRESS ... industry sets technical pace

tion of the latter is logically pre-sumed." Although "it is evidently not possible to forecast today with any certainty" in regards to prices of forest products and stumpage, the historical rise in stumpage value "tends to create a confidence in long-term investments in forestry-including sil-

Prof. Streyffert pointed out that for state forest ownership it is essential to ensure the future of forest industries and sections of the national economy depending on them by maintaining sustained vield. Silvicultural investments must be dependent on the resultant income which, in turn, is determined by stumpage value.

Concerning industry's investments in silviculture, these should not be regarded as made primarily with view to profitability. "What is important from the industry's point of view is to obtain a maximum quantity of raw materials for the sum allocated to forestry with due account taken for the period in which it may be available . . . However, even in this case the stumpage value will be of importance for financing silvicultural costs."

Management in U.S. and Canada

Forest management in United States and Canada has strong similarities and dissimilarities. Utilization is dominated by a large, well-organized private industry operating in a highly competitive system in each country. Industrial forestry is strongly businessminded and cost-conscious-this viewpoint permeating woodland and mill operations. As regards woodland management, the technical pace tends to be set in both countries by the pulppaper industry, reported K. P. Davis, prof. of forest management, School of Natural Resources, Univ. of Michigan.

Profound differences exist in land ownership and public policy affecting management practices between these countries. Of 489 million acres of commercial forest lands in continental U.S., 73% is in private ownership -of which 13% is in industrial holdings. Governmental ownership totaling 27% (21% federal the other 6% in state, county municipal). Private ownership is dominant but vast areas (chiefly in Western U.S.) are managed by federal government.

Industry is based on private lands but there is "considerable dependence on federal timber" in some areas, according to Prof. Davis. "Federal and state agencies directly administer the lands they own and sell stumpage to private bidders who are responsible only for cutting the timber under stipulated conditions." Large private owners are also timber processers. These tend to acquire more forest land and intensify management of

what they now have.

In Canada the federal government owns little forest land but the provinces own and autonomously administer about 93% of the total productive forest area. Large scale industrial units are practical necessities because of difficult accessibility and large capital requirements. "In major degree, this private industry is built on semipermanent leases of public lands. On these lands the lessee not only pay for stumpage cut but assumes much of the total land management job.'

Stand Improvement in U.S.A.

To date exotic species have been unable to compete with native species in the Douglas fir region which occupys the high rain-fall area of Washington and Oregon and extends into British Columbia. Therefore the

choice lies in some combination of Douglas fir. Western hemlock, Western red cedar, true firs (Abies) and Sitka spruce, according to E. F. Heacox, vice pres. and head of timber-land div. of Weyerhaeuser Co., Tacoma, Wash. "In general, the objective of land owners is to favor a stand composition that will maximize the yield of any combination of these species on each site. However, one land owner may seek to favor hemlock and true firs for their sulfite pulping qualities while another may favor Douglas fir due to the fact that today, at least, it is the more valuable wood for lumber and plywood.

Natural reforestation has been the principal method of securing new crops following harvesting of mature timber, which is chiefly on clear-cut basis with seed-bearing trees left tributary to the cut-over areas. The desired composition of new stands can be influenced both in the selection of the areas reserved for seed sources in the cut-over area and by controlling the condition of the seed bed. Seed sources are carefully selected with respect to wind currents, topography and thrifty trees of desired species.

Soil fertilization, primarily tried experimentally, on areas set aside for seed production "has substantially increased yield of cones and seed. It now appears that aerial application of fertilizers on natural seed sources can be used to improve and speed up natural reforestation. Aerial spraying of insecticides on seed sources to control cone and seed insects likewise promises to increase seed production, speed up the reseeding process and give better control over the composi-tion of the new stand," according to Mr. Heacox.

Factors adopted operationally or on

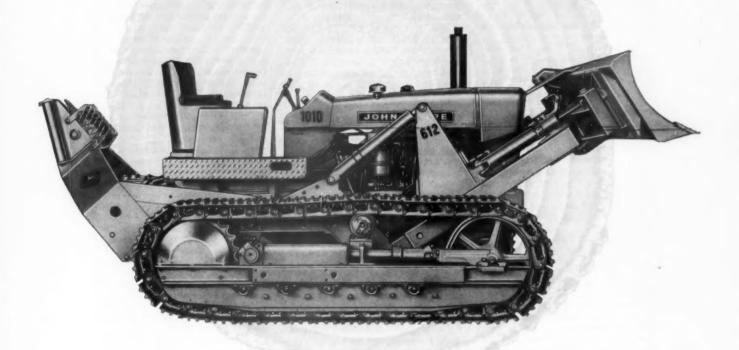


TROPICAL FORESTRY Section, which enjoyed broad participation, hears from former FAO officer M. N. Gallant, Surrey, Eng., regarding forestry obstacles.



FOREST ECONOMICS & POLICY Section hears paper on evolution on forest conversion in Burma from U.Tan Chein Hoe, chief conservator of forests, Rangoon.

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WORLD FORESTRY CONGRESS . . . silviculture at turning point

trial basis for improving forest stands include: Using toothed rather than straight tractor blades, confining logging of areas subject to compaction and puddling to the dry season, scarifying tractor roads following logging, laying-out and building roads with view to minimize channeling of surface water and reducing interference with subsurface water movement.

Mr. Heacox said pre-commercial thinnings have been limited to small experimental areas but enough work has been done to indicate that early thinning will be conducted on commercial scale within the next few years. Until recently, thinning of pulpwood and small sawlogs has been retarded for lack of market. But commercial thinning in intermediate stands is presently increasing at a rapid rate and can be expected to provide a significant part of the region's wood production within a few years. At present practically all of the buildings are essentially of a sanitationsalvage nature.

The Southern pine region, at the diagonally opposite portion of U.S.A., has considerably different characteristics. One of the main problems pointed out by Mr. Heacox concerns maintaining and improving stand composition. Tolerant hardwoods of inferior quality quickly take advantage of opportunities to invade pine sites. Control of wild fires have long been a forestry obstacle but considerable progress has been made during recent years. For the past 15 years the task of improving stand composition on pine lands and hardwood bottoms, and more recently the rehabilitation of non-productive land, has been moving ahead rapidly. This involves removing over-story hardwoods by girdling or with chemicals. Aerial applications of herbicide have been used to some extent. Tractor-mounted sprayers are showing promise as a means of controlling hardwoods in the lower canopy. Big tractors with shearing blades are increasingly used.

"Due to the rapid juvenile growth of our Southern pines and the relatively short rotations required for the production of pulpwood, forest genetics has advanced more rapidly in the South than in any other region of the United States. Emphasis is shifting from yield of cords per acre to yield of quality fiber per acre. As the ability to identify trees having inherent superior qualities is sharpened, more effort is going into the establishment of cone orchards designed to produce seed from superior strains of trees."

Forests Preserve Soil Fertility

In parts of the world the soils are leached to great depth. This is characteristic of regions of early geological areas of stable, high temperature and moderate-to-heavy rainfall. Such deep, poor soils, from which most of the soil nutrients have long since been removed form the normal forest soils of Ghana and other areas in West Africa. What fertility these soils possess, according to Peter Ahn, Ghana Div. of Agriculture, "is largely stored in the top soil and in the wood and leaves of the trees, the nutrients circulating in a closed cycle (leaf to topsoil to root to leaf) from which losses may be negligible. Such fertility has accumulated over considerable periods, and nutrients still circulating may have originated in rocks and soils long since removed."

Mr. Ahn stated "tree crops are undoubtedly the form of land-use best able to exploit these soils on a sound long-term basis, to protect them and to preserve some of the accumulated fertility for succeeding generations—hence the interest and importance of forestry."

Another management aspect presented concerned nutrient cycles and their modification. "Woodlands are essentially dynamic communities within which nutrients circulate in relatively large amounts," according to J. D. Ovington, of The Nature Conservancy, London, England, "The nutrient status of a woodland reflects the balance between the various processes concerned in the internal circulation and the inflow and outflow of nutrients. Most silvicultural practices modify nutrient circulation and, in particular, greater utilization of forest products is increasing the drain on the nutrient reserve.

"At present silviculture is at the turning point where the forest crop is no longer being regarded as a wild crop and with increasing domestication silviculture must be placed on a more scientific basis."

Changing Needs Foreseen

A new phase of forestry is at hand, according to Dr. E. K. Kalela, TAPIO Central Forestry Assn. of Finland, Helsinki. As the need for timber increases, forests not in use must be placed in commercial production where possible. This is a period in which the ratio between forest resources and increasing needs is approaching critical limits—initially just locally but subsequently extending to greater areas.

"These aspects are emphasized by the rapid expansion of the pulp industry and the necessity to increase capacity in the near future. This implies not only the rational use of remote forests but also a more systematic utilization of timber, an increase in the profitability of forestry and thus the opportunity of effective forest management and maintenance.

"The situation then approaches when present methods of forest management and reforestation can no longer produce sufficient timber and the subsequent danger of overcutting looms threateningly near. This state of affairs is obviously not so distant in the Northern countries and is leading to the adoption of new and more effective methods. . . . In other words, methods will increasingly resemble those of orchard cultivation.

This kind of development will be stimulated by the changes in the structure of the woodworking industry. The once predominant role of the sawmilling industry has continued to decline, while the part played by the pulp industry has increased and will obviously go on doing so. At the same time the significance of the technical quality of the timber has gradually decreased while the importance of pulp has increased-a fact that will accelerate the above development, especially in the creation of an extensive utilization, of small-dimensioned timber, and then by increasing the intensity and profitability of forestry.



International industrial consultant L. J. Rys, now mill mgr. of Cellulosa de Chihuahua S.A., Chihuahua, Mex., expects major pulp industry accomplishments in Chile from "Chilean pine". confusingly classified as both pinus radiata and P. insignis by dendrologists and long known as Monterey pine in its native central and lower California. Annual increment of this species in Chile is 20 to 25 Ms/hectare, thus requiring but onequarter the growing area as would Mexican and European forests, according to Dr. Rys. He anticipates expansion of Mexican pulp-paper industry to keep pace with 10 to 14%/yr. consumption increase.

Forest Products

Small Pulp/Paper Mills

The feasibility of small pulp and paper mills depends basically on a combination of protected market and a local, cheap source of fibrous raw materials. Also, the mill must be so sited that the cost of development and general services does not become burdensome.

These fundamentals for determining whether or not mill construction would be an economic success were presented by P. R. Sandwell, consulting engr., Sandwell & Company, Van-

couver, B.C., Canada.

"The possibility of being able to do something effectively and profitably on a small scale appeals to everyone who cherishes independence. For this reason many individuals, singly or in groups, seem to be searching for the secret of how to make pulp and paper profitably on a small scale. Those who succeed have not done so by some remarkable new discovery but only by finding a particularly favorable combination of circumstances."

Small mills in well developed and endowed countries will be confined to small special pulp mills integrated with established paper mills. Those in less advanced areas will be integrated pulp and paper mills serving small but well protected markets.

The small pulp mill must have raw materials at its disposal at lower costs than are available to international merchant mills, said Mr. Sandwell. Low-cost materials suggested include: Waste wood from grouped mills so remotely located that utility of the by-product wood is otherwise restricted to use as fuel in the mills themselves; waste wood from forests which primarily support a sawmilling industry and in which the normal extraction of sawlogs leaves material not suitable for sawing; thinning and rejected wood from intensely managed forest; wood species not commercially suitable for lumber manufacture; agricultural waste for which there is no suitable market or is presently used for purposes for which cheap substitutes can be found.

Pointing out that some pulp processes lend themselves to small mill application better than others, Mr. Sandwell listed these in the order of suitability: Conventional groundwood, chemi-groundwood, semi-chemical without recovery, acid pulp mills without recovery, semi-chemical with recovery, alkaline mills with recovery, acid pulp mills with recovery. Of the last three, he says there is little to choose between them, in principle, for small mills. In almost every case

it will be found that the capital investment for small-scale plants and the cost of operating them will be higher per unit of capacity than for large scale plants of the same kind.

"The addition of a small pulp mill to an established paper mill in an industrial community can be under-taken without creating management and operating problems of any particular consequence. . . . The establishment of a pulp and paper mill of any size in an underdeveloped country, or in an underdeveloped region in an industrial country creates problems of management and operation out of all proportion to the problem of building the mill itself. To some extent the small mill is better suited than the large, because the lack in underdeveloped areas is not so much of operators, technicians, and junior professional people, because they can be trained quickly or can be found abroad. The lack is in management and supervision itself."

As to market-resource relationship, Mr. Sandwell said "the markets for a small mill cannot be open to competition from larger mills unless the small mill is based upon a local resource so favorable that it offsets the capital and conversion costs of the larger mills. Preferably, the market should be captive, or so well protected by distance or political-economical barriers that the prices of the small mills' products are relatively high. In most cases the market should exist in combination with a local source of raw material for which there is no other use. Without a favorable combination of these circumstances, a small mill can hardly be expected to be

From the paper-making point of view, it is better to make special paper than mass papers. The equipment to be employed depends more upon local conditions than upon the size of the proposed mill, states Mr. Sandwell.

Large Quantity of Residue Wood

Of the world's timber harvest now used for industrial purposes, 60% is made into lumber, according to Halvor Skjelmerud, director of Norsk Treteknisk Institutt, Blindern, Norway. He estimates that 40% of this sawmill raw material becomes mill residue instead of lumber. This theoretically accessible source of wood represents more than % the world's present requirement for pulpwood. Vast quantities of sawmill slabs and edgings are presently utilized by this industry.

But fine residues have not found



Francisco N. Tamolang, chief, wood technology div. of Forest Products Research Institute, Laguna, P.I. sees promising prospects for pulp-paper production in Philippines. Of 30 hardwood species tested 25 responded favorably to kraft process, the bleachability ranging from moderate to "very strong." Cold soda process proved successful for bamboo and some hardwoods.

extensive use other than as fuel. Mr. Skjelmerud singled out the plant of Potlatch Forest Inc., Lewiston, Idaho, as one of the few mills utilizing sawdust as raw material for paper pulp. Development of a pulp chip sawblade and planer chipper-heads, both taking place in Canada and U.S.A., have potentials for increasing the amount of lumber residues which can be suitable for use by pulp and fiberboard industries.

Successful Integration

In Finland, relatively the most highly forested industrial country, all of the biggest forest industry firms are integrated-this process having its inception about 1900. A paper authored by E. Kinnunen, director of industry dept., Ministry for Trade & Industry, Helsinki, credits much of the industry's success to high utiliza-tion through integration. This was achieved by three main routes: Sawmills were augmented with pulp mills (and paper mills) to use mill waste; pulp or groundwood mills added paper and board mills and, to some extent chemical by-products recovery; spool and/or plywood plants expanding into building board field.

The general countrywide cooperation between sawmilling and chemical pulp industry is far reaching. Many relatively small sawmills have installed barkers and chippers to facilitate making marketable pulp chips from residues. Cooking chips have become a regular product which has a price quotation guaranteeing extra income to sawmills.

Another form of integration is that the companies exchange wood according to species which they have in surplus or need in additional volumes. An example of this is Finland's third largest kraft mill—which is owned by

WORLD FORESTRY CONGRESS ... wood as source of chemicals

five companies whose main line of production is sulfite or newsprint.

Gains from integration: Economical and complete utilization of raw material; utilization of entire range of species; insurance against slumps and recessions.

Chemical wood utilization-a field liberally documented with disappointments and few notable successesencompasses significant world-wide opportunities according to E. G. Locke, director, U.S. Forest Products Laboratory, Madison, Wis. "Because of the extent of the world's wood resource, and the highly important fact that this resource is rather rapidly renewable, it can be predicted with confidence that wood will some day equal petroleum as a source of industrial chemicals.

A successful industry based on chemicals from wood would be a tremendous tool for forest managers. Logging residues and little-used tree species could be harvested and utilized at a profit-benefiting for the immediate forest harvest and thinning operations and planning longrange species requirements for specific forest land, Dr. Locke stated.

Although chemical utilization of wood has not "achieved the successes that seem to be within its reach . . . its future looks brighter than ever (and) the need for more research . . . is becoming increasingly obvious."

Future for Broadleaf Pulps

Production of pulp from broadleaf trees in North America is growing rapidly and will continue to gain at an accelerated rate. This view was expressed in a paper by D. T. Jackson and R. F. Bower, Hammermill Paper Co., Erie, Pa. In 1925 these species represented 10% of total pulpwood used in U.S. This was a little over 600,000 cords. By 1950 the volume rose to around 3 million cords (13% of total pulpwood) and increased to an estimated 8 million cord consumption (21%) in 1959.

Today broadleaf woods are commercially pulped by each of the well known pulping processes-soda, sulfite, kraft, groundwood, semi-chemical, semi-groundwood and cold soda.

Canada has a large surplus of broadleaf species, mostly aspen and white birch, occupying cut-over and burned-over areas formerly occupied by coniferous forests. "Utilization of these species is important to the coniferous silviculture of Canada but use is decidedly limited by the relatively small volume of manufactured paper grades which can benefit most



PULP PRODUCTION IN SOUTH KOREA predicted by delegates from Seoul. (I to r) T. K. Burm, experiment station research forester, J. S. Bae, forester, Korean Bureau of Forestry, Y. J. Kim, director of Korean Forest Experiment Station. Korean production is 30-40,000 metric tons mechanical pulp/year, produced by three mills; an additional 20,000 tons of chemical pulp imported-chiefly bleached kraft from U.S.A. and Canada. According to Mr. Kim, timber shortages are being combated by concerted forest-expansion program involving planting grass and hardwood trees to stablize soil and conifers (pines & larch) planted as crop trees. Plans call for a mill to produce paper from straw but this has not been accomplished. Five hardwood plants are in production and a hardboard plant is now being built.

be made in the utilization of these broadleaf species in Canada, it will be necessary that some of the present or new pulping techniques be utilized to produce fibers suitable for inclusion in newsprint which represents a high percentage of the Canadian industry's output.

As to the industry in Mexico, "it would seem that the use of broadleaf species for pulpwood would furnish a valuable silvicultural tool in the management and regeneration of the extensive pine-oak forest type which extends through the mountains from the Arizona boundary to Guatemala. A market for broadleaf species as pulpwood is also important to the proper utilization of the extensive tropical hardwood forest found in the Yucatan Peninsula and in the coastal areas of Mexico.'

The broadleaf forest of North America "have the capacity to supply a much larger pulp industry and to supply the ever increasing demand for paper products for the foreseeable

That broadleaf wood can be expected to become a significant factor in newsprint production was indicated by J. N. Swartz, technical director, Bowaters Southern Corp., Calhoun, Tenn. Although hardwood species have been used to minor extent in newsprint furnish for several years (Ontario Paper Co., Thorold, Ontario, Can. has been using poplar for this

from the addition of broadleaf fibers purpose since 1942), construction of to the furnish. If much progress is to the first newsprint mill to operate wholly on hardwoods will begin soon. Noralyn Paper Mills Inc. has projected this plant, to be built in Louisiana, for using delta broadleaf species -chiefly cottonwood gum and hackberry-in conjunction with a pulping process developed by Herty Founda-

> A report on kraft paper-paperboard from broadleaf woods, by S. M. Temple, Development Div. of Australian Paper Manufacturers Ltd., South Melbourne, Australia, principally concerned eucalypt pulp. Australian ex-perience in this field indicates that kraft pulps from broadleaf woods are characterized by high burst, low tear, low freeness, good formation. An improved method of using such pulp involves blending it with long-fibered pulp of high tear, depending on the short fiber pulp for the major burst contribution. Ignoring corrugating paper (concerning which the trend is to NSSC), broadleaf kraft pulps appear to be best suited to such products as fruitboards, printing papers, and plastic laminating papers, according to Mr. Temple. "The characteristics of kraft pulp from broadleaf woods restrict their use to 20-30% of the furnish in the products where tear or liner cracking resistance is important and favor their use where strength is not important or where good formation is desired. The upper limit on broadleaf kraft pulp is currently 70%.

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WORLD FORESTRY CONGRESS ... kraft "best" for tropicals

Pulping of Tropical Woods

Practical aspects of pulping tropical woods, presented by L. J. Rys, mill mgr., Cellulosa de Chihuahua, Chihuahua, Mex., emphasized forest potentials, selection of species to be utilized, and their pulping characteristics.

He pointed out that Latin America, with 927,000,000 hectares, has the world's largest forest area. Of this total there are 727 million ha. of broadleaf trees, 15 million ha. coniferous trees, 8 million ha. of mixed trees. The virgin broadleaf forests may contain 50 to 100 species per hectare. Of the total forest area in Latin America, a little less than 9% is utilized almost exclusively for lumber production.

Coniferous wood, located in North Mexico, Brazil, and hills of Central America, as natural and planted Parana pine and in Chile as planted Insignis pine, is already used (except in Central America) for pulp-paper with satisfactory results. "The planting of conifers is not always an easy problem. Chile was lucky with its plantation of Pinus insignis and has already an export pulp and paper industry based on these forests. The same wood planted in Brazil and the Argentine gave complete negative results due to reverse humidity conditions in summer compared to Chile," said Dr. Rys.

Methods exist for utilizing short fibered broadleaf trees for making newsprint but it is still not easy to replace the kraft pulp from conifers with broadleaf woodpulp for manufacture of strong paper bags. "To decide what is best—whether to plant your own broadleaved tree forest or to utilize the virgin forests already existing—is a question of pure economy and some technical consideration."

If a mill is built in virgin forest the wood is cheap but construction is more expensive and transportation is usually very complicated, Dr. Rys pointed out. However "people are hard to get even if a new town is built with hospital and schools. The raw material is not uniform and may change its quality daily. To cover better the unproductive investment, the mill has to be built big enough, but the high production usually does not correspond to the consumption capacity of the country."

capacity of the country."

The kraft process "seems to be the best one for tropical wood" as practically any species may be used. Yield and strength of the unbleached pulp are relatively high and can be

bleached to a "good white." It was suggested that chip breakers and 2-stage kraft cooking, to improve penetration and remove the extractives before actual cooking, may improve the results.

Utilization of sub-tropical and tropical trees for groundwood manufacture is usually handicapped by darker color of the wood itself. In that short fibered wood does not give groundwood pulp suitable for newsprint, the cold soda process was suggested for these woods with a caution that "the lower yield, chemical treatment and necessity of bleaching does increase the cost of the groundwood." Subjecting chips to short cooks with sodium sulfite before defibering was offered as another possibility.

Forest Industry in Taiwan

Taiwan's Forest Products Industries provide a major contribution to the nation's economy, according to Chien Chu, senior specialist, Ministry of Economics Affairs, Republic of China. Export of these products contributes over \$8,000,000 per year to the national wealth. However several industry segments "are facing shortage of

raw materials" and there's need for sound forestry involving "careful forest management . . . less wasteful logging . . . improved transportation . . . to provide an adequate continuous source of forest raw materials."

Pulp is made from (1) coniferous woods by kraft, sulfite and ground-wood processes, from (2) bamboo by mechanical, magnesium sulfite and lime-soak processes, and (3) from bagasse. Annual paper production by 54 mills in Taiwan exceeds 83,000 metric tons. Paper-paperboard exports in 1959 totaled over \$2,520,000 and is expected to exceed \$4,000,000 in 1960. Kraft woodpulp is imported to make industrial packaging materials.

Because of the high cost of pulpwood, bamboo is finding "great favor as a substitute." Annual consumption of green bamboo poles totals around 50,000 metric tons.

Mr. Chu said the industry needs to orient its processes and equipment to use more hardwoods—"which will continue to be available for many years." Plans are being made by the pulppaper industry to establish its own forest to provide a steady supply of raw materials.

Tropical Forests

Opportunities and Problems

Although much progress has been achieved in tropical forestry no single solution has been developed as the answer to humid-forest silviculture. Immense amounts of knowledge are yet needed concerning the management of these forests.

In spite of the fact that formalized tropical forestry is comparatively new, some important accomplishments have already been achieved in this field. For example, Philippine industrial foresters are confident that efforts at growing forest crops on 15 year rotations are a success. Plans currently call for erecting at least one pulp mill of "no less than 100 ton/day capacity" to utilize wood harvests grown on 15 year rotations. A second generation crop is now being harvested for utilization other than pulp.

Prime obstacles to tropical forestry singled out at the World Forestry Congress included high management costs, land tenure, incomplete utilization and lack of markets. These are closely interrelated factors that in some cases accumulate to form rather formidable management obstacles.

A paper by M. L. Begue, chief,

Service Central des Eaux et Forêts de la France d'Outre-Mer, Paris, pointed out that management problems present themselves differently in homogeneous temperate-zone forests and in heterogeneous forests of the tropics. In the latter it is generally impossible to link forestry methods (for long-term results) with utilization (for immediate returns).

The problems vary widely, depending on extremely diverse types of tropical forests, and must be approached in a practical way. In Africa local markets are not of great importance and output is principally for export. But few of the many species included in the stands are utilized. It is, in practice, impossible to have sustained annual production. In Asia local consumption assumes great importance in some areas and some relatively homogeneous forests are adapted to intensive utilization.

Silvicultural techniques to be used vary a great deal in accordance with the nature of the principal species involved, according to Mr. Begue, "In the main, two methods may be used: Betterment of the stands and improvement of the plantations. The

evaluation of the possibilities for improvement is done by means of the inventory of the pre-existing trees."

"The maintenance of forest resources through forest improvement work must be the goal of the tropical countries in the immediate future, taking the place of that of sustained yield from the forest, the goal in temperate countries."

Regeneration Outlook

Humid tropical forests exploited for commercial species and otherwise untreated will continue in growth of less desirable species and tend to uneconomic forestry, according to Alistair Foggie, chief conservator of forests, Chana. Enormous areas of this sort have been lost to forestry because they have been taken over by "cultivations which are of doubtful permanent value but give immediate returns." He feels the only sure way to stop this process "is not by legal protection of the remaining forest but by showing that these forests can yield an economic and increasing return to mankind as forests, in preference to 'mining' by temporary cultivation of the accumulated nutrients in their topsoil. . . . When it is known that a fair average productivity of timber from the lands devoted to its production is being attained then the yield should be restricted to the growth in the interest of sustention.

Contributing to Poor Yield

Areas covered with exploitable forests are declining in the face of growing demands, according to F. H. Wadsworth, Tropical Forest Research Center, U.S. Forest Service, Rio Piedras, Puerto Rico. "Large productive potentials of lands available for tropical forestry, even where tree-covered, are largely untapped because of:

1. Tree species deficient in utility,

of inherently slow growth, small size at maturity, or poor formed.

2. Genetically inferior trees.

Damaged trees too poorly formed to be utilized.

 Areas overstocked with stems, many of which can never reach merchantable size.

5. Areas understocked, possibly supporting weeds.

6. Nutrient deficiencies.

7. Losses to insects and diseases.

"The removal of these limitations calls for drastic changes in existing forests, close control of growing stock, and probably also the use of some of the same techniques which are aug-

menting the returns from other forms of agriculture."

Concerning proprietorship of forests, Prof. W. A. Gordon, dept. of forestry, Oxford Univ., Oxford, England, expressed expectations that tropical regions "will follow the universal trend toward individualization of tenures." Although government ownership now insulates much tropical forest land from development, this may turn out to be temporary. "The growth of freehold conceptions is likely to affect the terms the government tenure and its security unless it can be shown that full commercial use is being made of forestland."

Logging

Adapt Logging to Local Needs

Log-handling and transport facilities, including roads, received prominent attention in the logging and forest operations section.

Even though opportunities for radically different hauling methods are envisioned, roads continue to assume increasing importance in most countries.

Local conditions determine just which of the wide range and types of logging and problems are involved on specific operations. As pointed out by Carl W. Raynor, timberlands mgr. of Georgia-Pacific Corp., Springfield, Ore., regardless of where forests are harvested "practical application of operating procedures is necessary for efficient management. This is equally true of elephant logging in Thailand and India, modified cable logging in Formosa, Philippines or South America, tractor and cable logging in North America, or the more intensive harvesting systems of Europe.'

Animal power, involving elephants

primarily and buffalo to a lesser degree, continues to be the simplest and cheapest means of skidding in portions of India. A paper on this subject by N. S. Kaikini and K. K. Naidu, conservators of the Indian Forest Service, Bangalore, Mysore State, pointed out that as far as tractors are concerned, difficulties in negotiating physical terrain and importation costs contribute to the practicality of animal skidding in tropical regions. Tractors are replacing animals for this purpose where more temperate climate prevails.

Under Indian low cost conditions of owning, operating and maintaining the elephant, its longer period of service, high pulling power and easy maneuverability against physical obstructions have given it the advantage over the tractor. However, the authors pointed out, "in a small range of conditions where the load, speed, slope and size of logs extends beyond the scope of elephants, tractor skidding is

the only solution."



FOREST & RANGE WATERSHEDS Section hears English translation of paper on controlling forest composition by Prof. A. A. Molchanov (left), Laboratory of Forestry, Academy of Sciences, Moscow, U.S.S.R.



INTERNATIONAL HOSPITALITY. This dinner at Mercer Island home of A. H. Lundberg, pres. of A. H. Lundberg, Inc., entertaining congress delegates from Sweden, Finland, Mexico, typifies receptions held in Seattle homes during the meeting.

WORLD FORESTRY CONGRESS ... "hovercraft" for logging

Hovercraft Logging

Roads continue to assume increasing importance in forest communications. This trend is, and will continue to be, reflected in present and future construction by higher densities and better standards. So stated E. R. Huggard, dept. of forestry, University College of N. Wales, Bangor, Wales, England.

"The vast majority of the world's forests are at present critically underroaded when viewed in the light of recent calculations into economic optimum density. It is very likely that, long before the backlog can be eliminated, the desirable density will have increased even further. In Great Britain there are approximately 13,000 miles of forest road suitable for extraction already constructed in 3½ million acres of forest, compared with 40,000 miles eventually required, discounting future planting."

Mr. Huggard, in his appraisal of road needs, noted that present evaluations are founded on the assumption that logging developments will continue along existing line. He then injected the possibility of using ground-effect (hovercraft) machines for logging. These "open up a new concept of forest transportation hitherto unknown." The principle of these crafts involves providing a nearly uniform pressure between the craft and the sea or land surface beneath it. According to Mr. Huggard, "there is every reason to believe that this fundamentally new principle will play an important role in the transport field."

Mechanical Handling Benefits

Concerning loading-unloading pulpwood from rail cars and trucks in Southern U.S.A., T. N. Busch, operations chief, Woodlands Dept. of Southern Kraft Div., International Paper Co., Mobile Ala., emphasized the benefits derived from mechanized handling at rail yards. Where previously nearly half the wood transported by railcar was unloaded at the mills by hand, it's now done mechanically. "In 1959, 99.9% of our wood was received in open racked cars which were all unloaded by machinery at substantial savings and labor costs." Of the results, he said "from the humanitarian standpoint as well as financial gain, I believe that the development of the mechanized yard system has contributed more diverse benefits to more people concerned with the industry as a whole than any other factor during the same period of time. This change could have been brought about sooner but making it practical involved concentrating pulpwood loading to a lesser number of loading points to make equipment usage economical.

MACHINERY-EQUIPMENT DISPLAY at U. of Wash. stadium was representative of various regions.



Three types of barkers displayed by Nicholson Mfg. Co.—two for processing logs, one for slabs.



Combination crane-grapple, HIAB "Speedloader," enables truck operator to load, unload pulpwood mechanically.



Exhibits Chmn. E. P. Stamm (left), retired vice pres.—timberlands, Crown Zellerbach Corp., discusses displays with P. A. Shoudy, sls. mgr., Nicholson Mfg. Co.



Logging machines for Douglas fir region (I to r) Garrett "Tree Farmer," rubber-tire tractor for selective logging; truck-mounted 65-ton crane with 50 in. hydraulic tongs and mobile 90 ft. steel yarding tower with Berger rigging and yarder.



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WORLD FORESTRY CONGRESS

Mechanization has resulted in major labor savings. "Since our competitors have, for the most part, adopted our procedures in establishing mechanized yards, it is within the realm of reason that the mechanized wood yards have conservatively saved over 2 million man days in 1959."

This has not resulted in unemployment problems. Instead there is actually a growing shortage of pulpwood cutters. Rapid industry growth and increased farm mechanization brought about a migration of farm labor to industrialized urban areas. "We are heavily dependent on this diminishing farm population for woods workers to produce the paper industry's ever increasing requirements."

Logging, Transport Improvements

A paper on efficient cable logging, by Prof. H. Steinlin, Univ. of Freiburg, Freiburg, Germany, emphasized the application of telphers (light car suspended from and running on cables). The modern form of telpher cranes is independent of terrain configurations and facilitates reaching a given point at minimum cost. "However, linkage with the public network (roads) is difficult and goods must be transferred, since the vehicles capable of traveling on the cable are of a special type."

Technical developments of recent years "have made it possible for us to service entire areas by means of a network of cables or a combined network of cables and roads. Compared to a network of roads, the capital invested is low since a single telepheric can service a wide area."

From the forest exploitation standpoint Prof. Steinlin says significant importance should be given telepheric cables inasmuch as they make it possible to load wood at any point of the line and, in certain cases, drag it laterally to the carrying cable. Units on which several loads can travel simultaneously are economical over distances of 1.5 to 2 km. because of their great carrying capacity. Mobile installations are gaining in importance.

Forest exploitation in tropical West Africa during the past 30 years has brought about increased mechanization in the woods, also longer transport distances. According to J. LeRay, chief, Div. des Exploitations, Centre Technique Forestier Tropical, Nogentsur-Marne, France, narrow-gauge railways made possible the increase in haul distances from woods to floating points up to 40-50 km. This transport system has year-around dependability and limited flexibility; rolling stock can be maintained with but minimum need of skilled mechanics; track system requires large work force. The railways are expected to rather gradually give way to truck transportation as personnel are trained and modern road-building methods adopted.

Pulpwood Resources Extensive in Wyoming's Laramie Peak Range, Says Report

There are 40,000 cords of pulpwood available for harvesting annually in the Laramie Peak Range of Wyoming, according to a special report issued by the Chicago & North Western Rwy. Some 60% of the pulpwood is lodgepole pine, the balance ponderosa pine.

The publication is one of several issued recently by the C&NW. Another (see below) deals with forest resources in the St. Croix-Winona area of Wisconsin and Minnesota.

In the Wyoming region studied there are some 480,000 acres of commercial timberland. About 70% of the timberlands are in private ownership, the balance owned publicly, primarily in the Laramie Peak div. of the Medicine Bow National Forest. The entire area is available for timber harvesting, the North Western reports.

The Laramie Peak Range is in the east central part of the state. The area extends from a few miles south of Casper, 50 miles east to Douglas and some 50 miles south of the latter city.

Primarily Pulpwood Size

The Chicago & North Western provides single-line hauls to pulpwood markets in the Lake States; and multiple carload rates could be established for the area, it says.

Timber stands in the region are primarily of pulpwood size. Lodgepole pine averages 25 cords per acre and may go as high as 50 cords. Prevailing practice is to clear-cut in block or strip in this timber type, greatly facilitating logging operations. Large volumes are available on nearly level or gently sloping terrain. Clear-cutting practices make logging on steeper slopes practical. It is said that the large volume of lodgepole pine will support cutting for an indefinite period.

Pole sized stands of ponderosa pine average 15 cords per acre, with volumes as high as 30 cords. Logging is on a selective basis, but access is good in the ponderosa pine type. Profitable operations are said to be possible.

Volume of pulpwood in sawtimber stands maye be as high as 10 cords per acre, which may be removed in the first cutting.

Elevations range from 6,000 to 9,000 ft.

New Industry Possible

Development of a pulp or particle board industry in the St. Croix-Winona area of Wisconsin and Michigan could utilize coarse sawmill residues, surplus cordwood material and some of the lower-grade logs. This is one of the conclusions of the C&NW's forest resources survey of this portion of western Wisconsin and eastern Minnesota.

Present use of cordwood — or poletimber — material that can be charged

Ownership of Commercial Forest Lands St. Croix-Winona Area (Acres)

Ownership	Wisconsin	Minnesota	St. Croix- Winona Area
Farm	711,100	424,400	1,135,500
Other Private	175,240	53,600	228,840
Federal	14,700	9,700	24,400
State, County &			
Municipal	96,560	10,500	107,060
Total	997,600	498,200	1,495,800

against allowable annual cut is 78,-000 cords. An additional 53,000 cords are available each year for industrial use, which would permit a 68% hike in production to 131,000 cords per year, accordingly to the railway foresters.

In addition to these resources, there are an estimated 51,000 tons coarse residue developed each year at saw-

mills in the area. Expansion of sawtimber and poletimber to the allowable annual cut would raise this total to some 89,000 annual tons.

There are now 241 sawmills in the area. Many are limited to custom sawing and may operate only a few days a year. Expansion of the present sawmill industry could utilize the surplus sawlog material. And if markets were

developed, says the railway, existing mills could utilize coarse sawmill residues in production of bark-free chips. Hardwood pulpwood could also be produced in conjunction with logging operations.

These and similar reports are available from Chicago & North Western Railway Co., 400 West Madison St., Chicago 6, Ill., Tel: DEarborn 2-2121.

An "Electrocardiograph" Measures Tree's Health

An unusual machine that is used on a tree in the same way an electrocardiograph is used on the human body is being operated by University of Washington forestry researchers to increase tree-growing efficiency in the Pacific Northwest.

The machine, known as an "URAS Infra Red Gas Analyzer," was built to order by Hartmann & Braun, Frankfurt-am-Main, West Germany, for the university's College of Forestry. Said to be the only one of its kind in the United States, it was designed to specifications provided by Dr. David R. M. Scott, asst. professor of silviculture, and Dr. Richard B. Walker, associate professor of botany.

"The machine can measure the carbon dioxide at six parts of a tree at one time, and makes continuous records on a chart," Dr. Scott explained. "There has been some work of this kind done in Germany, but none in the United States with this machine."

The apparatus has six plastic cylinders placed at various parts of a tree. The cylinders are attached to instruments which measure and record the carbon dioxide content of the air inside them. Carbon dioxide measurement is an indication of the efficiency of bio-chemical processes affecting tree growth.

Tests made with the machine show which parts of the tree foliage or "crown" are most useful to the health of the tree. As a result, inefficient parts of the crown and entire inefficient trees can be eliminated. Using the analyzer, forest land could be put to better use because more and stronger trees could be crowded into our forest areas.

"We just nudge nature a little bit in the direction we want," Dr. Scott explained. "The machine will enable us to make the proper nudge to grow trees more efficiently."

Costing \$3,500, the tree analyzer was financed by a grant from the U.S. Forest Service, with supplementary support from the University's Agnes H. Anderson Research Fund. Currently, the analyzer is being used 24 hours a day for research on Douglas fir at the university's experimental Pack Forest.

"The particular type of URAS which we are using follows closely the instruments previously built by Hartmann & Braun for Prof. Bruno Huber of the Institute of Forest Botany, Munich, and for Dr. W. Tranquillini, University of Innsbruck, Austria," reports Dr. Walker.

Logging With Safety

The Stamm Tree Farm Div. of Crown Zellerbach Corp. at Vernonia, Ore., as result of operating more than 2000 consecutive injury-free days, may deservedly bear the title "nation's safest logging show." During this period of over five years, the Vernonia logging trucks toted up some 1.5 million miles of travel, pickup trucks about half this mileage. The 75-man woods crew worked more than 555,000 injury-free man hours since early in 1955.

A check of available records indicates this is a record for consecutive injury-free days for U.S. logging operations. The Stamm loggers have been awarded 22 citations, including four National Safety Council plaques and Governor's Logging Safety Awards.

Safety is not a "come lately" aspect

of CZ policy. But even this safetyconscious organization has tended to experience lower injury frequency rates in its manufacturing divisions than in woods operations.

Last fall Crown Z President Reed O. Hunt eliminated any possibility of accepting two standards of safetyone for mills, another for woods. This was revealed in his talk at the Governor's Annual Safety Conference at Olympia, Wash. He said the idea that logging is an extra-hazardous part of the industry, entitled to special forgiveness where safety is concerned, is no longer acceptable. Praising the progress made through the industry's joint labor-management program, he said the improvement had, during the previous 14 years prevented at least 9,000 injuries in Washington.

In addition to the humanitarian benefits, Mr. Hunt pointed out that the kind of safety program a company enjoys may have considerable effect on the cost of the products produced. A Washington company enjoying the best kind of safety record has nearly \$3 per day per employee industrial insurance rate advantage over those having the poorest kind of safety experience.

"All of us, labor, management and government, have a real economic stake in industrial safety," stated Mr. Hunt, "This is particularly true in logging where we are paying stiff penalties for too many accidents. Last year logging, with only 1% of the state's man hours of employment accounted for 7% of loss time accidents and 20% of industrial fatalities."

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Northeast

Robert T. Nader has joined St. Croix Paper Co. at Woodland, Maine as asst. purchasing agent. . . .

Edward R. Gay, vice chairman, St. Regis Paper Co. is now a vice president i/e American Management Assn's. research and development division. Joseph H. Sutherland, president, Kimberly-Stevens Corp., is now chairman of the board. . . H.T. Rindal, vice president of production succeeds him as president and William K. Saunders, sales mgr. of industrial products, becomes vice president of merchandising and sales. . . .

Henry F. Scheetz Jr. has resigned as chairman of the board of Brown Co., but continues as a director. His duties will be assumed by Leonard A. Pierce, president.





Dunning

Baldwin

Scott Paper Co. Elects Two Executive Vice Presidents

All distribution activities, including retail, industrial, and specialties sales, advertising, sales promotion and marketing research, in the U.S. and abroad will be under direction of **Harrison F. Dunning**.

All manufacturing, engineering and research and development will be under direction of Paul C. Baldwin.

Administrative Vice President Andrew J. Shroder 2nd, will continue to direct and coordinate service functions including legal, industrial and public relations, treasurer, controller, purchasing, traffic, quality control and office management.

Vice President G. Willing Pepper, in addition to his industrial sales activities with Mr. Dunning, will continue to report to the president on special assignments.

Vice President James L. Madden, in addition to direction of future planning and timber resources, continues to report to the president on special assignments. Vice President George Carleton will continue to direct Scott's international expansion program.

. . . John J. McDonald, mgr. of Brown's Co's. pulp sales since 1951 has been promoted to general mgr. of the Sulphite Pulp and Floc division. . . . Dr. Paul M. Goodloe, formerly director of research and development, is now mgr. of Brown's newly organized chemical products division. . . .

Dr. William Mullen is now vice president i/c production, Plastic Papers Inc., Hicksville, N.Y., Kenneth J. Rawson moves to vice president i/c sales and George S. Price has been appointed director of research.

Associate professor Norwood H. Keeney, acting head of the dept. of paper technology at Lowell Technological Institute is now on sabbatical leave of absence to study for his doctorate at the University of Manchester in England. He will work in colloid chemistry and chemical engineering as related to paper technology.

Arthur E. Dean has joined the technical service dept. of Oxford Paper Co. at Rumford, Maine as instrument supt. with responsibility for the meter dept. . . . Robert C. Whitney also has joined, as project engineer to work with Ashton Hamilton on technical projects. . . . Arnold F. McKenney has joined Oxford as training mgr. . . .

Leonard R. Lefkowitz is now physical scientist, Huyck Felt Co. . . . Marshall A. Metzger, controller, Oxford Paper Co. and Edward D. Teston, Union Bag-Camp Paper Corp. have been elected to membership in the Controllers Institute of America.

Frank W. Partsch, vice president i/c Boston district office, J. O. Ross Engineering, division Midland-Ross Corp., has retired after 39 years with Ross. He was one of the four founders of Ross and was a director and vice president until the 1957 merger which formed Midland-Ross Corp. . . . George F. Schuning has been promoted to district mgr. of the Boston office to succeed Mr. Partsch. . . . Oscar Byron, sales engineer for 27 years with Ross in the New York office, has also retired. . . .

Rodger Derby has been named mgr. of board sales for Weyerhaeuser Co's. pulp and paperboard division according to D.G. Currie, division vice president.

. New Weyerhaeuser administrative offices have been opened in New York City at 609 Fifth Avenue. The offices will be joint headquarters for C.S. Huffman, member of Weyerhaeuser's law dept. and Harry S. Mosebrook, mgr. of public affairs, eastern region. Primary purpose of the office is to provide legal, community relations and public affairs



John F. Rousseau Joins Perkins-Goodwin Co.

Mr. Rousseau will be general account executive, headquartering in New York and will be active in pulp and paper sales. He was previously sales manager, Finch, Pruyn & Co., Inc.



William C. Froude, Jr., Joins Northeastern Paper Sales Inc.

Mr. Froude will assist Victor R. Coudert Jr. in pulp sales in Eastern U.S. A native of New Jersey and a graduate of Rutgers U., Mr. Froude was with Arabol Mfg. Co. for three years and Air Reduction Sales Co. for two years.



Dr. Allen S. Powell, Dir., Research, Texon, Inc.

Dr. Powell will be in charge of development of new products and applications of Texon's manufacturing process (wetweb saturated cellulose products). He has been manager, chemistry section, materials development, nuclear division, Combustion Engineering, Inc., in Windsor, Conn., since 1957.

Strictly Personal

services for all company units in the Eastern and Midwestern U.S. .

J. Edmund Becker, J.P. Lewis Co., Beaver Falls, N.Y. is now chairman of the New York-Canadian division for PIMA. Other officers are Stanley J. Leishman, 1st vice chairman, Thorold Div., Provincial Paper Ltd.; George A. Rogers, 2nd vice chairman, International Paper Co., Hudson River mill, Corinth, N.Y. and E. Horton Girdler, 3rd vice chairman, West Virginia Pulp and Paper Co., Mechanicville, N.Y. Industrial affiliate representative is Eugene Cavanaugh, The Sandy Hill Iron and Brass Works, and secretary is John Lynch, Corn Products Sales. Treasurer is John Turnbull. -Maurice R. Castagne.



Raymond P. McGinley, Mgr. of Services, Penobscot Chemical Co.

Mr. McGinley is a graduate of the University of Maine and has been associated with International Paper Co. at Livermore Falls, Maine, Tileston and Hollingsworth Paper Co., Hamilton Paper Co., The Black-Clawson Co. and more recently as plant engineer with Standard Packaging Corp., Missisquoi division, Sheldon Springs, Vermont.



Myron C. Durkee Joins **Knowlton Brothers**

Mr. Durkee will be technical assistant to the production vice president and will assist in management of the plant's production facilities. He's a graduate of Earlham College (A.B.), has a B.S. from U. of Michigan. Since 1957 he had been associated with Nicolet Industries, Inc. and before that Scott Paper Co. for nine

Midwest

C. H. Horch becomes gen. mgr. and George W. Ruth Jr. asst. production mgr. at Chillicothe Paper Co., Mead Corp. subsidiary. Mr. Horch returns to Chillicothe after serving as mgr. of Mead's Leominster (Mass.) div. Since 1957 Mr. Ruth has served as supt. of finishing operations at Chillicothe. . . . In another Chillicothe change, Mill Mgr. W.A. Thomas is transferred to the Mead General Engineering dept. as asst. power engineer. . . . Arthur W. Hines is named vice pres. in charge of manufacturing and a director of Raymond Bag Corp., Middletown, Ohio division of Albemarle Pa-





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- . MADE IN DISC DIAMETERS FROM 36" TO 153"
- . COMPACT, MURCO ROUND LOG PULPWOOD CHIPPERS REQUIRE LESS FLOOR SPACE.

MURCO Round Log Pulpwood Chippers are designed to include the most desirable features for today's production requirements .. the result of long and careful study of the various features that contribute to outstanding chipper performance in producing more and better chips at less cost ... less sawdust, fewer slivers, freedom from repairs yet at the same time having production records of 100 cords or more per hour. The MURCO heavy design construction reduces vibration.

All backed by years of constant development so that each year results in an improved chipper design, the latest of which is MURCO UNI-CHIP that produces more uniform chips with less bruising.

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Perhaps the skilled hand of Nopco can go to work for you. Back of every chemical made by Nopco for the paper industry stands Nopco Technical Service-an experienced staff ready to assist with laboratory data and recommendations based upon your specific requirements.

DEFOAMERS WAX SIZES COATING ADDITIVES PITCH DISPERSANTS METALLIC SOAPS RAG COOKING SURFACTANTS DE-INKING AGENTS

FELT WASHING DETERGENTS CALENDER STACK LUBRICANTS ANTIBLOCKING AGENTS DEWAXING AGENTS POLYETHYLENE EMULSIONS

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per Mfg. Co. He joined Albemarle at Richmond, Va., in 1930. . . .

Karl R. Bendetsen, president and member of the board of directors of Champion Paper & Fibre Co., Hamilton, Ohio, has been elected a director of Westinghouse Electric Corp., Pittsburgh. . . . Harold Heinbuck, recent mechanical engineering graduate of Michigan College of Mining & Technology, is named process engineer with the Technical dept. of the KVP div., KVP Sutherland Paper Co., Kalamazoo. . . . Shelton J. Jones is appointed mgr. of the St. Louis plant of West Virginia Pulp & Paper Co.'s Multiwall Bag div. Formerly plant production mgr., he suc-

ceeds Allen G. Woodruff, resigned. . . . George S. Trees, a director and regional sales mgr., is named a vice pres. of Chicago Bridge & Iron Co.

cago Bridge & Iron Co. . . .

Dr. John H. Schulz joins the paper technology faculty at Western Michigan Univ., Kalamazoo, following completion of his doctoral studies at the Institute of Paper Chemistry. He replaces Raymond L. Janes, who begins doctoral studies at the Appleton, Wis. school. . . . Thomas W. Englert is appointed to the new post of director of market research for Packaging Corp. of America, Evanston, Ill. He was previously director of market research and product development for the

Lord Baltimore Press div., International Paper Co., and was at one time associated with West Virginia Pulp & Paper Co. . . .

C. M. Carson, exec. vice pres. of Hoerner Boxes Inc., Koekuk, Iowa, announces appointment of Richard G. Hackney as mgr. of the Sioux Falls, S.D. plant. He replaces John Pojunos, who becomes gen. mgr. of the plant now under construction at Waukegan-Gurnee, Ill. . . .



Dr. Roger W. Strauss in Research for Nekoosa-Edwards

He was a former faculty member of the New York State College of Forestry, Syracuse, and joins the Research dept. of the Port Edwards, Wis. firm as a section leader for chemical and physical study. Dr. Strauss has been an instructor in pulp and papermaking at the New York school while competing studies for a doctor of philosophy degree. He was at one time associated with Hammermill Paper Co., Erie, Pa., in technical sales, was also with Bauer Bros. Co.



John Schulz

New Faculty Member for Western Michigan University

Western Michigan Univ., Kalamazoo, Mich., annonunces appointment of a new faculty member, Dr. John Schulz, a graduate of Brooklyn Polytechnic Institute with a major in chemical engineering and a minor in polymer chemistry, recently completed his ph.d. work at the Institute of Paper Chemistry.

The number of new students at WMU has increased for the fall semester. Systematic recruitment with the aid of the newly appointed executive secretary of the Paper Technology Foundation, Inc., and of alumni is expected to result in larger freshmen enrollment next year.



There's more to a Lodding Doctor than meets the eye Few qualifications for manufacturing count more than experience. And when experience has been concentrated within a specialized line of endeavor it adds value to the product.

Lodding Doctors carry that extra value derived from experience — experience accumulated over thirty years of specialization in the manufacture of doctors, doctor blades, blade holders and their accessories. During this period, Lodding has built and installed doctors for every conceivable doctoring application, under all conditions and of every type and size, up to and including the Great Lakes Paper Company's 340 inch newsprint machine.

Installations of Lodding Doctors are found in nearly every paper mill in this country and in many mills abroad. Each was precision engineered and precision manufactured for the specific roll being doctored.

Doesn't it make sense to rely on specialized experience? Most mills have found that it does. Next time, get Lodding Doctors. Then you'll profit too.



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Puget Pulp's centri-cleaners



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...the uniformly strong, clean, white chlorine dioxide bleached softwood sulphite

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Robert M. Brown, Supt., Aetna Paper Co.

He succeeds the late W. Clare Monaghan as supt. of this Dayton, Ohio div. of Howard Paper Mills Inc. He joined Aetna in 1954 as mill chemist and was named asst. supt. in 1957. Earlier this year Mr. Brown was given added responsibility as safety supervisor of the division.





Dwight Stocker Named to

The president of KVP Sutherland Paper Co., Kalamazoo, Mich., will serve a five-year term on the board of the Appleton, Wis. school. From 1952 to 1960, Mr. Stocker was president of KVP Co., which merged with Sutherland Paper Co. in January. He had previously been president and gen. mgr. of Michigan Paper Co.

is named Midwestern regional sales mgr. for the Scientific & Process Instruments div., Beckman Instruments Inc., Fullerton, Cal. . . .

G. Ronald Wilmer, 30-year container industry veteran of Grand Rapids, Mich., is appointed to the new position of gen. supt. of container plants for Packaging



Nicholas Repke, Plant Engineer, Crystal Tissue Co.

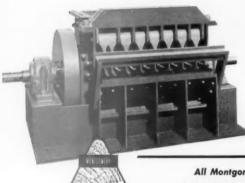
For the past three years he has been asst. plant mgr. of Nicolet Industries Inc., Hamilton, Ohio. His appointment by the Middletown firm was announced by John E. Burdsall, vice pres. for manufacturing. Mr. Repke will work under the direction of Harold Suhs and will give special emphasis to the power plant area. He is a member of both TAPPI and PIMA.

Corp. of America, Evanston, Ill. He will continue to make his headquarters in Grand Rapids, where he has been supt. of the firm's container plant. Prior to his career with Packaging Corp. and American Box Board Co., one of its three predecessor firms, Mr. Wilmer was with Hygrade Containers Ltd. of Canada. . . .

JACKSONVILLE BLOW PIPE COMPANY announces the

NEW K-C Model of the marvelous MONTGOMERY BLO-HOG (pat. pending)

ESPECIALLY DESIGNED FOR PAPER MILL SERVICE



- Minimum of down time and maintenance.
- Punch and die action.
- Tramp steel protection with replaceable shear pins on outside of machine.
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OTHER MODELS ARE AVAILABLE FOR RE-CHIPPING AND BULL SCREEN REJECTS

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But, frankly we do make terrifically good WIRES ... economical too, because they wear well and are tailor-made to your specific paper requirements.



PULP & PAPER

Strictly Personal

E. J. Kiddie is gen. mgr. of the Detroit corrugated box plant of the Paper Products div., Owens-Illinois. He was formerly asst. gen. mgr. and sales mgr. at Jacksonville, Fla. . . .

The Technical dept. in the KVP div. of KVP Sutherland Paper Co. has named two research engineers: David L. Brew, 1960 graduate of the School of Paper Technology, Western Michigan Univ.,

Kalamazoo, and James J. Matousek, chemical engineering graduate of the Michigan College of Mining & Technology.—Don W. Zeigler.

Rudolph C. Germanson Retires at KVP Sutherland

Long associated with the paper industry, he was most recently technical con-

sultant to the vice pres. of sales for the Kalamazoo firm. Prior to that he had served as supervisor, laboratory mill technical service.

Mr. Germanson was born in Little Chute, Wis., and went to work for Kimberly-Clark Corp. in 1913 at the age of 18. He was graduated from the Univ. of Michigan as a chemical engineer, later returning to K-C as a paper machine boss at the Niagara Falls, N.Y. mill. He remained with the Wisconsin-based company until about 1936, with exception of a short period with the old King mill in Kalamazoo.

He later joined the staff of the Institute of Paper Chemistry at Appleton, Wis., as technical advisor to the administrative officers. He was already the holder of numerous patents, including a wirecovered table roll used on some tissue machines and a coating process first used by Kimberly-Clark.

Mr. Germanson joined KVP in 1941 as a research chemist and was soon given an eight-month's leave of absence to serve on the War Production Board. Returning to KVP, he played a major roll in readying the Espanola, Ont. pulp mill for its first run in 1946.

Pacific

Weyerhaeuser Co. has created a marketing research dept. within its Research div. Manager is Leonard M. Guss, formerly associated with the Battelle Memorial Institute in Columbus, Ohio. His headquarters will be in Philadelphia, chosen because of its proximity to eastern markets and information sources. . . .



Sidney M. Collier, Exec. Vice Pres. and Gen. Mgr., Spaulding

He was named gen. mgr. of Spaulding Pulp & Paper Co., Newberg, Ore., in early 1957 and vice pres. and director in 1959. A native of Tacoma, Wash., he is widely known in the West Coast industry and has held important positions in both U.S. and Canadian firms. Announcement of the appointment was made by James A. Foxgrover, Spaulding president. Mr. Collier is active in both TAPPI and PIMA and is a past chairman of the Western Canadian Technical Assn.



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Low Initial Cost and Operating Economy

A new development in the well-known LAMB Airfloat Table—an economical, open-orifice design providing constant, all-over escape of air from the table top. No marking of bottom sheets—no expensive air-release valves. The unusually small, open holes provided permit use of very low air pressure, furnished by a blower. The constant escape of air is very light and creates no bothersome

effect in this new, cost-saving LAMB Airfloat Table. Stacks push effortlessly on a film of air.

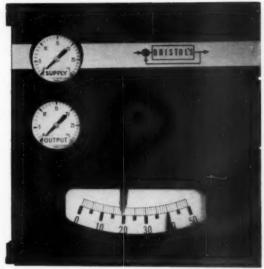
Yes—the standard LAMB Airfloat
Table with ball air-escape valves is
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Series 624 A/D* pneumatic controller features simplicity and high control stability

- . Simple modular design for ease of servicing
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- Designed for batch-type and continuous processes
- Proportional and proportional-plus-reset control models available

Top control performance with maximum simplicity plus standard Bristol precision measuring elements—those are the key features of the Bristol Series 624 Controller. The 624 uses the same renowned elements that have earned such a reputation for accuracy and dependability on other Bristol automatic controlling and recording instruments—perfected through wide experience and many years of development.

Self-contained modular design of the control unit speeds servicing. The whole modular unit, consisting of an aluminum casting with working parts made of stainless steel, Ni-Span C, and Neoprene diaphragms, can be removed by taking out only two screws and a link.

Outstandingly compact, the aluminum instrument case (only 8" x 8" x 5" overall) is completely weatherproof. It is designed for either flush, surface, panel, or valve mounting. Attachments for pipe mounting (2-inch pipe) are available. Write for complete data on the versatile and economical 624 A/D. The Bristol Company, 142 Bristol Road, 0.95 Waterbury 20, Conn.

*Advanced Design

CONTROLLERS OFFERED FOR:

PRESSURE AND VACUUM: Ranges from full vacuum to 10.000 psi.

TEMPERATURE: Ranges from -100°F to +1000°F.

FLOW AND DIFFERENTIAL PRESSURE: With mercury-type manometer and dry-type differential unit

LIQUID LEVEL: With bulb unit and mercury manometer and dry-type differential unit.

HUMIDITY: Zero to 100% relative humidity.

CONTROL UNIT CHARACTERISTICS:

PROPORTIONAL BAND: 0-400% continuously adjustable, direct- or reverse-acting.

RESET: 0.1 to 50 repeats per minute.

AIR PILOT: Non-bleed type. PILOT CAPACITY: 3.0 scfm.

FREQUENCY RESPONSE: Flat to 300 cycles per

minute.

TEMPERATURE STABILITY: Less than 0.25% change in the output pressure for 90°F temperature change.

MATERIAL: Aluminum housing; 316 stainless steel internal parts; Ni-Span C feedback element.

BRISTOL...for Improved production through measurement and control AUTOMATIC CONTROLLING, RECORDING AND TELEMETERING INSTRUMENTS

. . . Jim Wakefield, St. Regis, recently assumed duties as resident cost engineer for the Tacoma, Wash. expansion program. He was formerly senior project engineer at the Hinton, Alta. pulp mill for two-and-one-half years and is affiliated with the Central Engineering dept. of Jacksonville, Fla.

M. C. Bonney, resident forester, Longview, Wash. branch of International Paper Co. elected president of Abernathy Forestry Assn., an organization formed eight years ago by owners of forest lands in this region to facilitate better fire protection and other forest practices. . . .

RERTand NASH

William Pittam, member of the West Coast pulp and paper industry several years and now a consulting engineer for Stone & Webster Engineering Corp., transfers from Boston to the San Francisco offices in the Russ bldg... James G. Baldwin, gen. mgr. for the Western Chemical div., Hooker Chemical Corp., Tacoma, Wash., is named to the advisory board of the Washington State Institute of Technology...

Donald M. Gomer has been added to the staff of Tidland Machine Co., Camas, Wash., as sales engineer. He will represent the firm in specialized custom-built equipment for the pulp, paper and con-

OPERATED

wire guide

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New . . . Simple . . . Compact.

with reliability and precision.

Now operating on machines at speeds over 2,000

Although entirely air operated, this new guide

uses air only when a correction is made. What's more, "swing roll" effect or guide roll

Guide roll is held stationary if air supply is

interrupted . . . there are no springs to pull guide roll with possible damage or loss of wire or felt.

Complete standardization of all guides can be

guide is used for wires, wet and dryer felts.

Manufactured and sold exclusively by -

easily accomplished because the same model air

We invite you to request for our representative to call.

oscillation is completely eliminated.

fpm, the Gilbert and Nash Air Guide reacts quickly

verting industries. . . . Frank H. Helmholtz becomes sales mgr. for Andre Paper Box Co., San Leandro, Cal. He was formerly asst. merchandising mgr. of the Dairy Packaging div., Fibreboard Paper Products Corp. . . Donald C. Blasius, former distribution mgr., is named gen. sales mgr. of McCulloch Corp., Los Angeles chain saw manufacturer.—Louis H. Blackerby.





Mullanev

Osborne

CZ Industrial Relations

B. T. Mullaney, formerly mgr. of the Specialized Personnel Placement dept. in the Portland, Ore. regional office, transfers to Crown Zellerbach Corp.'s West Linn div. as community-industrial relations supervisor. He succeeds D. L. Osborne, who joins the Industrial Relations dept. of the Gaylord div. at Bogalusa, La.





Ostenson

Mille

Gus Ostenson, Production Mgr., Crown Zellerbach International

Gus Ostenson, long-time Crown Zeller-bach Corp. papermaker and resident mgr. of the Antioch (Cal.) div. since 1955, becomes production mgr. of the organization formed in 1959 to develop new markets and expand operations abroad. Headquarters are in San Francisco.

Last year Mr. Ostenson spent a month in India as technical production advisor to Rohtas Industries Ltd., with which CZ has contracted to provide technical assistance and personnel training in paper production.

Succeeding Mr. Ostenson at Antioch is John M. Miller, asst. resident mgr. two years. Mr. Miller, a graduate electrical engineer, joined the Camas (Wash.) div. in 1936 and in 1956 was named asst. resident mgr. at Port Townsend.



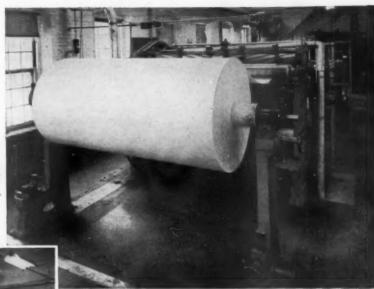
APPLETON MACHINE COMPANY

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Clark-aiken MACHINERY

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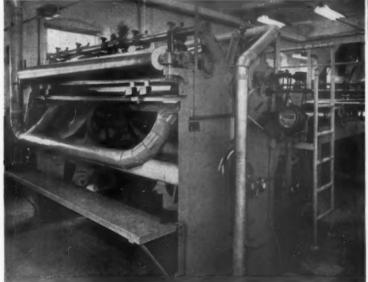


Mr. Gilbert D. Kittredge, general superintendent, Crane and Company, Dalton, Massachusetts, writes:

"We have been using Clark-Aiken equipment for over twenty years with excellent results. Our new cutter was installed with a 100" trim paper machine and replaced another type C cutter which was not wide enough for our new installation. The new C cutter represents considerable improvement over the older type which we have had in service for a good many years. Considerably higher cutter speeds are possible and with the many adjustments on the machine extremely accurate sheeting may be achieved. We do not operate this particular cutter at high speeds, however, as it follows the paper machine on a three shift basis and the sheeting is watched very carefully for removal of any imperfect paper at this point.

"In the manufacture of our quality papers it is important that a good sheeting job is done and the Clark-Aiken cutter fits this bill extremely well.

"We have always received excellent service and co-operation from the Clark-Aiken organization and can highly recommend their sheeting equipment."



Clark-Aiken machinery—custom tailored to individual requirements—makes fast, efficient and practical automation a reality in your finishing room!

If, like Crane and Company, your primary concern is for quality but you still want to boost production and lower finishing room costs then investigate the advantages of completely integrated equipment designed by Clark-Aiken to fit your needs.

Forward-looking management has been quick to recognize the benefits of practical finishing room automation. And they turn to Clark-Aiken, an acknowledged leader in the manufacture of paper mill machinery, to supply the solution to their specific production problem. Consult Clark-Aiken for immediate and considered attention to your finishing room equipment needs.



957 SPRINGFIELD ROAD LEE, MASSACHUSETTS

Strictly Personal



Ray F. Bower, Resident Mgr., Grays Harbor Paper Co.

Formerly woodlands mgr. for Hammermill Paper Co., Erie, Pa., he was named to his new position following formation of the Hoquiam, Wash., firm that is owned jointly by Hammermill and Rayonier Inc. Grays Harbor Paper's two-machine mall can produce 70,000 tons fine paper per year and marks the first time that Hammermill's watermarked lines have been produced outside the Erie plant.

Canada

Frank P. Hughes has been appointed technical director, Island Paper Mills, the MacMillan, Bloedel & Powell River Ltd. fine paper subsidiary recently completed at Annacis Is., near New Westminster, B.C. He was formerly technical supervisor with KVP Co. Ltd. at Espanola, Ont., and later with Sorg Paper Co. in Ohio and the Marathon Corp. research group in Rothschild, Wis. . . . Harold Webb is office mgr. at Island Paper Mills, A graduate of the Univ. of British Columbia. he was introduced to the paper industry in 1946 while employed by B.C. Bridge & Dredging Co. on installation of No. 8 newsprint machine at Powell River. . . .

W.J. Turner, formerly plant mgr. at Heron Bay, Ont., for Ontario Paper Co., Ltd., has been named divisional mgr., Ontario woodlands, by H. Arthur Sewell, exec. vice pres. He will be located at the head office in Thorold, Ont. His successor is G.A. Genge.



A. Deane Burnside Named To Columbia Pulp Sales

In making the announcement, W.E. Duggan Gray, gen mgr. of Columbia Pulp Sales Ltd.—sole distributors of Columbia Cellulose and Celgar pulps, explained that Mr. Burnside will work with Stanley A. Meighen, western district mgr., principally in the marketing of Celgar kraft, which will become available when the big new mill near Castlegar, B.C., goes into production.

Mr. Burnside is a 1948 graduate of the Univ. of British Columbia and studied at the graduate school of business administration, New York Univ. He has held management positions in advertising and sales promotion.





- 3. Choice of 4 interchangeable filter elements to best suit your requirements—5, 25, 64, 74 microns.
- 4. New, stronger transparent bowl.
- 5. Larger bowl capacity and larger quiet zone for trapping collected liquid.
- 6. Improved baffle design prevents return of liquid to air line.
- Quick, easy cleaning—no tools needed—only 4 parts to handle.



Where safety regulations require protection for bowls from external physical damage—a removable metal bowl guard is available.

Founded in 1926

C. A. NORGREN CO.

3458 SOUTH ELATI STREET ENGLEWOOD, COLORADO

Norgren Filter removes <u>all</u> liquid from compressed air

The improved design of the new line of Norgren Filters provides a greater than ever liquid removal efficiency—removing all liquids over the entire range of recommended air flow. Removal of abrasive solid particles is also highly effective.

New, stronger transparent bowl is an important feature of the new filters. This bowl has a higher safety factor than ever before and a much greater resistance to fatigue.

The bowl has a larger capacity for collected liquid. The "quiet zone" below the baffle holds 53% more collected air-line contaminants—requires less frequent draining.

Servicing is easier and quicker. No tools are required to disassemble the filter for cleaning, and there are only four separate parts to handle.

For complete information about the money-saving features of the Norgren complete line of manual drain and automatic-drain filters, call your nearby Norgren Representative, listed in your telephone directory—or WRITE FOR BROCHURE NA-1.

PULP & PAPER

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Hall Mason

New Executives Appointed by Howard Smith Paper Mill

Wilfred N. Hall, new president of Howard Smith Paper Mills Ltd., is shown here examining new machine with H. E. Mason, former mgr. of the Cornwall, Ont. division, who becomes exec. vice pres. and gen. mgr. Mr. Hall, a native of Vancouver, B.C., succeeds D.S. Abbott, who has retired because of ill health. Mr. Abbott, however, continues as a director. Mr. Hall was formerly president of Dominion Tar & Chemical, a Howard Smith affiliate, and at one time served as a chemist with Canadian Industries Ltd.

C. Vincent Callaghan is the new supt. of technical services, Bathurst Power & Paper Co., Ltd., according to announcement by John A. Hanna, mgr. of operations. He has been with the company for 21 years. . . . J.D. Hennessey is asst. mgr., industrial relations, Anglo-Newfoundland Development Co., Ltd., according to P.L. Shapleigh, mgr. N.W. Pinsent has been made personnel supt., and W.W. Hickman personnel supt., logging operations.

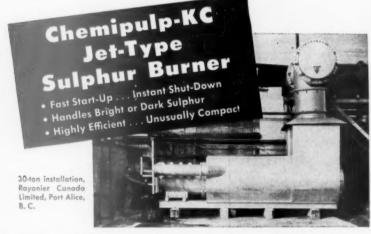
Barney Evans was honored by Dryden Paper Co. Ltd., Dryden, Ont., when he retired recently as salvage supt. At a dinner party for him Mill Mgr. T.S. Jones acted as chairman; P.S. Quinn, mgr. of manufacturing, made presentation of a certificate of merit in recognition of Mr. Evans' 37 years of service with the company. N.I. Howe, production supt., on behalf of mill superintendents, presented a silver tray. Mr. Evans will live in British Columbia. . . . E.G. Shorter, vice pres., production, MacMillan, Bloedel & Powell River Ltd., Vancouver, B.C., presented a paper on wood utilization at the summer meeting of the Technical Section, Canadian Pulp & Paper Assn. in Banff,

Several representatives of United Kingdom firms have recently toured Canada, some of them participating in the Banff meeting. Among those in the party were A.F. Tout, N.C. Underwood, L.W. Causer and A.H. Wells of Bowaters Research & Development Co.; E.J.B. Miller, Starch Products Ltd.; J.D. Whittaker, Greenbank Engineering Co., and John Tyler and Maurice Brown, National Industrial Fuel Efficiency Service. William G. Reekie, mgr. of engineering for Abitibi Power & Paper Co. Ltd., died recently after a long illness. He was 62. He joined Abitibi at Fort William, Ont., in 1926 and has been associated with the industry since that time.-Charles L.

Southern

Preliminary Report—Southern and Southeastern Supts.: The 1960 session of this, the biggest meeting of the year in the South, got started a day ahead of schedule. The setting was Williamsburg, Va., probably the most noted of America's historical shrines, and many wives were in attendance. Many registrants moved in the day before registration began to tour Williamsburg's "restored" areas.

Initial indications are that this will probably be the most heavily attended meeting yet, thanks to the ladies. The Women's Committee, headed by Bauer's Pat Shouvlin and Wes Gallup of Williams-Grey with assistance by co-chairmen Larry Strange of Nopco and Bird Machinery's Bob Miller, were hard at work providing enough transportation for the heavy distaff registration.



In the Chemipulp-KC Burner, molten sulphur is sprayed into the burner as a fine mist; heated secondary air is then introduced in several stages, resulting in clean, efficient burning. The burner quickly reaches its operating temperature of about 2400°F., minimizing production of SO₃. Operates efficiently at all SO₂ concentrations between 12%

and $18\frac{1}{2}\%$. At $2100^{\circ}F$, bitumen in dark sulphur is completely burned.

Available in a range of sizes up to 50 tons of sulphur per day and each size will produce SO₂ gas efficiently through a wide operating range. Compact design and flexibility of layout permit installation in limited space.

Write for Bulletin 100

Chemipulp Process Inc. Woolworth Building, Watertown, N.Y.

Associated with Chemipulp Process Ltd., 253 Ontario St., Kingston, Ontario Pacific Coast: A. H. Lundberg, Inc., P. O. Box 186, Mercer Island, Wash.
Lundberg-Ahlen Equipment Ltd., 779 W. Broadway, Vancouver 10, B. C.



Three Promoted at Bowaters

T.C. Bannister Jr., gen. mgr. of Bowaters Carolina Corp., has been named a vice pres. of the Catawba, S.C. mill. He will continue as gen. mgr. At the same time, Lowell Culbertson, acting mill mgr. at Bowaters Southern Corp., Calhoun, Tenn., was made mill mgr. He was formerly in the Engineering div. of Union Bag-Camp Paper Corp. at Savannah, Ga. And Joseph O. Evans, asst. industrial relations mgr. at Bowaters Southern, is promoted to personnel mgr.





FOR UNIFORMITY

Uniform color and particle size mean uniform performance in paper. And all grades of UNITANE are of uniformly high quality to insure unsurpassed brightness, whiteness and opacity. Ask your Cyanamid Pigments representative about UNITANE

CYANAMID

AMERICAN CYANAMID COMPANY, Pigments Division'
30 Rockefeller Plaza, New York 20, N. Y.
Branch Offices and Warehouses in Principal Cities.

AVAILABLE FOR PROMPT SHIPMENT

(Tributyl Phosphate)









IMPORTANT USES:

ANTI-FOAM AGENT

TBP is one of the most efficent chemi-cals for preventing undesirable foam-

- THE 1. Manufacturing Process

 - Can Filling Operation
 Final Application
- OF 1. Synthetic Resin Emulsions
 - (paints, etc.)

 2. Paper Coating Compounds
 - 3. Adhesives
 - 5. Textile Sizings

 - 6. Detergent Solutions 7. Many Other Systems

- WITH

 1. Low Cost (in one application as little as one-drop in a one-pint can before filling with a resin emulsion gave 20% more cans per minute than before.)
 - 2. Practically no residual odor.

SOLVENT METAL EXTRACTION

TBP is widely used for the solvent extraction of certain metals and rare earths. At present, in this field, the largest use is associated with the atomic energy processes both in the initial preparation of the ores and the recovery of spent reactor fuels. Our TBP meets the AEC specifications.

OTHER USES

A high boiling solvent for most natural gums and synthetic resins for lithographic inks, etc. TBP is a recommended solvent with excellent blending power for preparing concentrates of 2-4D acid.

TBP is non-corrosive, non-flammable, with a pour point of <-80°C. and a vapor pressure of only 7.3 mm. Hg at 150°C. These properties suggest its use as a functional fluid for a variety of applications: such as a heat transfer

MAY WE SUGGEST you also investigate KP-140 (tributoxyethyl phosphate) as an antifoam agent.

> FOOD MACHINERY AND CHEMICAL CORPORATION

Chemicals & Plastics Division

161 East 42nd St., New York 17, N. Y. Dept.PP

It was a rare setting for the hectic festivities. Most of the hospitality suites were in Colonial cottages surrounding the plush Williamsburg Inn and evening dinners, rather than served en masse banquet style, were held in the three most picturesque restaurants in the town. The ballroom of the Williamsburg Lodge was the scene of two dances on consecutive evenings, with arrangements handsomely taken care of by chairman Roscoe Brooks, with assistance from honorary chairman Jack Whitener and Paul Easton. Fred Wilkerson, Dan Cameron and Frank McGrath were in charge of the festive hospitality party while John Muller headed the golf committee and Clarence Brown was chairman of the committee which set up fishing trips. The job of ramrodding all these committees and overseeing the entire operation fell on the shoulders of Williams-Greys' Herb

Probably the most heavily taxed committee was the registration group headed by Cecil Terry and Osborne Marrow, ably assisted by Sandy Elliott, Chig Shoudy and John Taggert. Dave Jones and John Halsey were general chairmen of the whole convention this year and a tip of the Confederate hat goes to them for tying it up so neatly.





International Paper **Traffic Promotions**

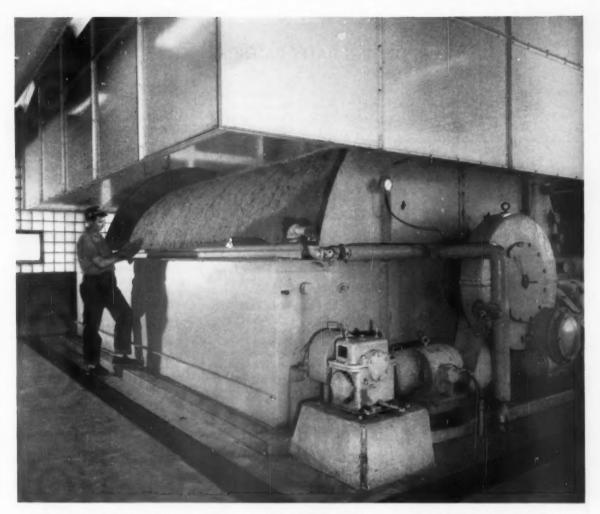
Jacque V. C. LeBeau, chief clerk of International Paper Co.'s Southern Kraft div., becomes asst. traffic mgr. He is a 20-year veteran on the IP staff. At the same time, Howard Peters, with the firm more than 18 years, becomes asst. to the division traffic mgr.

" . . . and over here, J.G., we're experimenting with noodle pulp handling!"



Find out how RADER **CUTS CONVEYOR**

Write to: Rader Pneumatics, Inc. 1739 N. E. 42nd Ave., Portland 13, Oregon RADER PNEUMATICS.



EXTRA-CLEAN PULP--UNUSUALLY LOW DILUTION

Essential to the economical production of quality paper, a well-washed pulp with low dilution is mandatory at Thilmany Pulp and Paper Company.

That's why the Kaukauna, Wisconsin paper-maker relied on Swenson to provide the washers that furnish clean pulp at the lowest possible dilution. Now, with its line of Swenson 4-drum, 5-stage brown stock washers, Thilmany reports improved performance ... and marked reductions in operating costs accompanied by an increase in quality of paper.

Long-time favorites, Swenson Pulp Washers are designed and engineered specifically for brown

stock washing. Send for your copy of the interesting new color Bulletin 243, "Processing Profiles"—a tour of Swenson Processing Equipment in action at Thilmany and many other installations.

Swenson Evaporator Company, 15632 Lathrop Avenue, Harvey, Illinois.



PROVED ENGINEERING FOR THE PROCESS INDUSTRIES SINCE 1889

SWENSON



WHITING-MANUFACTURERS OF CRANES; TRAMBEAM HANDLING SYSTEMS; PRESSUREGRIP; TRACKMOBILES, FOUNDRY, AND RAILROAD EQUIPMENT

MEETING DATES CALENDAR

October 31-November 2

Packaging Institute (22nd National Packaging Forum) Statler-Hilton, Hotel, New York, N.Y.

November 10-11

Carolinas-Chesapeake Section Forest Products Research Society Hotel Carolina, Raleigh, N.C.

November 13-16

Society of American Foresters (60th Annual Meeting) Sheraton-Park Hotel, Washington, D.C.

National Assn. of Corrosion Engineers (Canadian Region East-

Sheraton Mount Royal Hotel, Montreal

November 15

Miami Valley PIMA

Manchester Hotel, Middletown, Ohio

November 16

Lake States TAPPI (Quality Control) Elks Club, Green Bay, Wis.

Pacific Section TAPPI (Modernization)

Michigan PIMA-Kalamazoo Valley TAPPI Hotel Harris, Kalamazoo, Mich.

November 17-18

Technical Section, Pacific Coast Branch CPPA

Qualicum Beach, Qualicum Beach, B.C.

December 1-3

Pacific Coast PIMA (Annual Fall-Meeting) Hotel Multnomah, Portland, Ore.

December 12-14

U.S. Dept. of Health, Education & Welfare (National Conference on Water Pollution)

Washington, D.C.

Empire State TAPPI Metropolitan District (Dyeing of Paper) 465 Lexington Ave., New York, N.Y.

December 15

Ohio TAPPI (Plastic Fourdrinier Wires) Manchester Hotel, Middletown, Ohio

Connecticut Valley PIMA (Winter Meeting)

Publick House, Sturbridge, Mass.

January 17

Pacific TAPPI (Process and Quality Control)

Tacoma, Wash.

January 19

Michigan PIMA (Annual Papermakers Get-Together) Hotel Harris, Kalamazoo

lanuary 24-27

Technical Section CPPA (Annual Meeting) Oueen Elizabeth Hotel, Montreal

More equipment manufacturers choose Fast's Couplings than any other gear-type coupling

Leaving other claims aside, the thing that counts in couplings is customer confidence and industrial equipment manufacturers have made Fast's their overwhelming choice. The Fast's line is more diversified, too-in a complete range of sizes and types for shafts, from 1/2" to 32" and larger.

Every Fast's Coupling brings you superb engineering only the original gear-type coupling can deliver. Smoothrunning units that are designed to outlast the machines they connect. Rapid service from experienced field engineers backed by outstanding stock facilities. Write today for full details on couplings to suit your needs to: KOPPERS COMPANY, INC., Fast's Coupling Dept., 1311 Scott St., Baltimore 3, Maryland.



FAST'S COUPLINGS

Engineered Products Sold with Service

International Bulk Handling Of Chemical Woodpulp Near

A big pulp producing combine in Sweden and a correspondingly big pulp consuming combine in Great Britain are thinking seriously of inaugurating a program of shipping and receiving pulp in bulk-possibly in pellets, now being tried by mills in U.S.A. and Australia, or in noodle form, also being done in U.S.A.

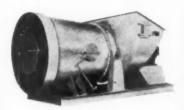
The manner in which Crown Zellerbach ships pulp in loose form, in holds of specially built ships over 1,000 miles from British Columbia, Canada, to mills in California, is a method which is of interest. Many thousands of tons would be shipped this way from the Baltic Sea and across the North Sea to British mills.

QVF Heat Exchangers

Glass heat exchangers manufactured by Q. V. F. Ltd. of England are being sold in the United States through Corning Glass Works.

With the addition of these units to our line of Pyrex shell-and-tube heat exchangers and cascade heat exchangers," said William H. Tomb of Corning, "we can now offer a full complement of glass heat exchangers, coolers and absorption units to a wider variety of processing industries."

ESF Newsletter



FAN REGULATES AIR FLOW INSTANTLY

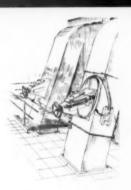
Time was when an airplane's propeller was a pretty inefficient device. Along came the variable pitch prop, which vastly improved performance. Now SF engineers have adapted the variable pitch propeller to industrial uses. The result? New economies in your plant operation.

The impeller blades of SF's Axial Flow Fan can be adjusted while the fan is running at a constant rate, thus enabling the air or gas flow to be continuously varied. This makes for unprecedented regulation economy and high efficiency in your operation.

The direct-driven SF Axial Flow Fan operates at a higher speed than centrifugal fans, therefore higher speed motors can be used. No expensive gearing between motor and fan is required, a feature that decreases the initial cost of the fan installation. The impeller blades are easily replaced without costly dismantling of the whole fan—thus less cost for maintenance.

Forty-eight standard sizes are available, for flows ranging from 60,000 to more than 600,000 cfm. SF has full details for the asking.

Reg. U.S. & For. Pat. Off.



FLUE DAMPER HAS POSITIVE SHUT-OFF

This drawing shows two SF leakproof Flue Dampers in operation. The unit in the foreground is a phantom view showing the unique seating arrangement of the patented Damper. By turning the handwheel (a remotely controlled electric drive is available, too), the disc, now in the open position, moves forward and upward to seat firmly against the circular portway in the diagonal wall. Spacious inspection doors provide ready access.

Their design fits SF Dampers to an endless number of applications: in electrostatic precipitators for soda recovery unit flue gases...in boiler furnace plants... economizers... scrubbers... and wherever effective and positive dust shut-off is essential. They are a strong link in the plant economy chain, as the sealing surfaces are well protected from particle deposits, and down-time for cleaning and maintenance is negligible.

Twelve standard sizes are available for flow rates from 6,000 to 250,000 cfm. Standard-type will operate at temperatures up to 900°F. Write us for a brochure.



SF HEAT RECOVERY UNITS SAVE BTU'S and DOLLARS

SF Heat Recovery Units offer tremendous savings in many areas of a mill operation. Savings are so great in fact, that people in mills which have had these units installed have been rumored to call them "money machines."

One thing that the SF Heat Recovery Units do is to utilize heat from various drying processes which would otherwise be lost through the exhaust system. This, of course, means that your heat supply and power costs go down.

And, the recovered heat can be used to pre-heat make-up air for the dryer, for ventilation purposes or to pre-heat water if desired.

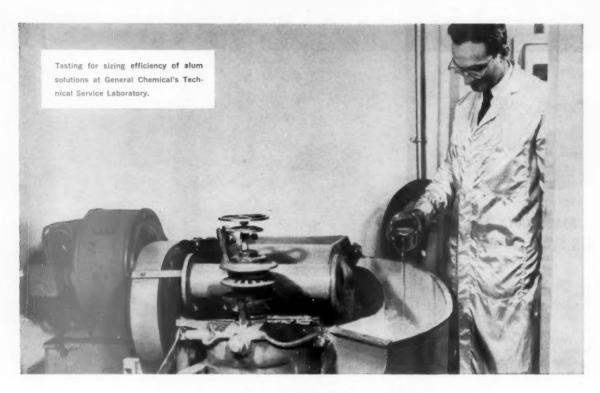
Building maintenance can be cut down, too. With the help of an SF Heat Recovery Unit, walls and roof can be kept dry all year round, so moisture damage and building rot can be things of the past.

Call or write today, and let one of SF's engineers show you how an SF "money machine" can cut down your operating costs and increase your profits.

AMERICAN SF PRODUCTS, INC.

420 Lexington Avenue, New York, N. Y.

• SF Products Canada Ltd., ☆ 940 Cote de Liesse Road, Montreal



in GENERAL CHEMICAL ALUM

Another difference ∧ is TECHNICAL SERVICE

As the country's primary producer of alum, General Chemical is constantly helping customers solve technical problems involving the use of aluminum sulfate. Results? Improved efficiency and reduced operating costs for them.

Here are some of the services our Technical Service Department offers you:

- Supplying basic information helpful in planning design and installation of storing, pumping, metering and feeding facilities.
- Suggesting improvements to eliminate existing storing and handling problems.
- Providing chemists and operators with physical and chemical data necessary for the most effective use of alum.
- Assisting in laboratory tests and plant trials.

Running check analyses in our own laboratories.

In the paper mill, our specialists advise on the most efficient use of aluminum sulfate for a particular mill's requirements. They can provide assistance on the important conversion from dry to liquid alum, and furnish guidance on the proper design of new installations and selection of materials to avoid handling or maintenance problems. In many instances, chemical problems arise in operations which are not necessarily related to alum. At such times, General's Technical Service continues to offer helpful advice and lend assistance whenever possible.

This kind of Technical Service is one of the reasons why General Chemical is a good company to do business with for *your* mill's alum requirements. We will welcome the opportunity to serve you.

Basic to
America's Progress

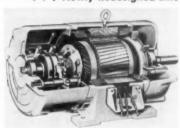


GENERAL CHEMICAL DIVISION
40 Rector Street, New York 6, N. Y.

PULP & PAPER

New Equipment Section

Wound Rotor Motors . . . Newly Redesigned Line

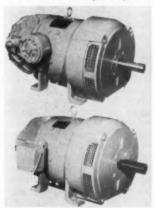


Applications: Suggested for elevators, cranes, hoists, printing presses, etc. Advantages: Line features substantial reductions both in size and weight, while retaining heavy-duty and corrosion-resistance construction. Rotor is precision ground and has both ends dynamically balanced for quiet, vibration-free operation. Possibility of end coil shorts is eliminated.

Specifications: Motors meet NEMA Standards in frame sizes 213 to 326 U. Units can be furnished with open, drip-proof or totally-enclosed, non-ventilated enclosures for horizontal, ceiling or sidewall mounting.

Supplier: Louis Allis Co. (Advertising dept.), 427 E. Stewart St., Milwaukee 1, Wis., Tel: HUmboldt 1-6000.

Totally-Enclosed DC Motors
. . . Two Major Departures

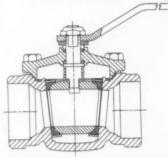


Applications: For both constant-speed drives and drives involving fast, wide speed changes and reversals, automatic control or close regulation. Advantages: Two major departures from conventional design: (1) use of high-temperature silicone insulation system for machines rated and built for continuous operation with tem-perature rise of only 75°C, and (2) application of new high-capacity system of controlled ventilation in which blowers and heat exchanger are mounted at shaft end. Principal advantages include: faster response, stability and increased insulation life; armature inertia decreased 75%; field time constant decreased 35% commutating ability of H line increased 35%. Insulation life under all temperature conditions is said to be 10 times that of conventional Class B insulation. To eliminate any possibility that silicone vapors might be driven off during operation at high temperature, armatures and field coils receive a long bake at 200°C to fully cure the sili-

Specifications: Line includes totally-enclosed fan-cooled and totally-enclosed non-ventilated machines in both industrial and explosion-proof construction. Motors rated from ½ to 60 hp at 300 to 3,500 rpm. Generators rated from ¾ to 40 kw at 850 to 3,450 rpm. Accessories for both machine types use same motor mounting adapters.

Supplier: Westinghouse Electric Corp., P. O. Box 2099, Pittsburgh 30, Pa., Tel: EXpress 1-2800.

Top-Entry Ball Valves
. . . Available in New Design



Applications: For controlling gases, liquids, slurries, semi-solids, difficult-to-handle and corrosive chemicals at temperatures of from $-100^{\circ}\mathrm{F}$ to a max. of $350^{\circ}\mathrm{F}$.

Advantages: Now available with socket weld connections in 1-, 1½-, 2- and 3-in. sizes, the new design permits

valve body to be permanently welded into the pipeline. In addition to topentry design, units feature fully self-adjusting ball seals and double back seated stem seals. Other features: low pressure drop, two-way flow, quarter turn operation and, according to the manufacturer, drip-tight service "for hundreds of thousands of cycles."

Specifications: Access to valve parts is by a removable bonnet and stem assembly. Socket dimensions made to American Standard Steel Socket-Weld Fittings Schedule 40. Body materials are carbon steel or Type 316 stainless. Seats are Teflon or Buna-N. Max. pressure is 700 psig, depending on temperature. Line also includes flanged end valves in sizes from 1 through 6 in. and screwed end valves in sizes from 1 through 3 in. Bar stock valves without top entry are available in %-through 2-in. sizes with screwed or flanged connections.

Supplier: Hills-McCanna Co., 4600 W. Touhy Ave., Chicago, Ill.

Paper Trimming Knives
... Prolonged Accuracy, Blade Life



Applications: For paper cutting and trimming operations.

Advantages: The Jet-Cut knife is said to be the only paper trimming tool made with the entire face area polished, as well as a polished bevel cutting edge. Polished face is instrumental in reducing drag and draw and maintaining high degree of cutting accuracy. Long blade life results from specially-hardened high-alloy steel. Users are said to report up to two to three times longer service between regrindings.

Specifications: Jet-Cut is available in stock to fit all makes and models of cutters. For special applications, it can be ordered to suit exact specifications. Supplier: Ohio Knife Co., Dcpt. F, Cincinnati 23, Ohio, Tel: KIrby 1623.

Rail Car Shaker . . . No Sidewise Movement



Applications: For unloading wood chips and other bulk materials.

Advantages: Operated by one man, the unit incorporates new low-frequency vibration shaker mechanism for "fast, economical unloading of hopper bottom cars." Mechanism transmits vibrations to top of car sides, parallel to horizontal axis of car and in direction of car's maximum strength. It is claimed that no undesirable sidewise movement is produced. Energy of length-wise impacts is transmitted through car, loosening material so it can flow freely through hopper openings. Shaker can be mounted anywhere along car's length

in single or multiple track arrangements, with fixed or traveling hoists or cranes.

Specifications: Shaker can unload hopper bottom cars at rate of 8 to 10 per hr. Lengthwise shaking action is produced by two unbalanced weights mounted on a shaft turning on two spherical roller bearings through a 20-hp motor. Features include rigid steel frame, reinforced mounting shoes for maximum contact area, floating motor mounted on rubber bushings, low noise level and level-lifting attachment.

Supplier: Link-Belt Co. (Folder 2745), Dept. PR, Prudential Plaza, Chicago 1, Ill., Tel: RAndolph 6-7790.

Plastic Pipe . . . Chemical Resistance Featured

Applications: For use in processing and transferring of acids, alkalis and solvents.

Advantages: Easy to install, the reinforced furane pipe is chemicalresistant, strong, dimensionally stable and can carry—without distortion or deterioration—hot corrosive liquids and gases at temperatures up to 300°F at pressure of up to 150 psig. Flow rates are increased because of streamline design, smooth bore and the hydrophobic property. It is said that Eonite pipe helps safeguard purity and quality control standards. It may be sanitized by either steam or chemical sterilization and is immune to fungus or bacterial attack. Piping, it is claimed, withstands weathering, does not deteriorate with age and is not affected by sunlight, moisture and atmospheric conditions. It does not soften or sag with weight, is designed for leak-proof field assembly. No cements, solvents, threading, welding or special techniques are required. Pipe can be cut to length with a hacksaw or brick saw, and a screwdriver and wrench are the only other tools needed for installation. Specifications: The new furane plastic pipe is available in 15-ft. lengths in seven sizes with wall thicknesses from he in. to he in. and from 2 in. to 12 in.

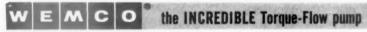
I. D. Also offered are 45° and 90° ells, tees and reducers. Supplier: Cornelius A. Rauh & Assoc. Inc., 1191 Sunset View Dr., Akron 13,

Valve Positioner



Applications: For controlling pipeline

Advantages: Type 3560 V/P employs a characterized cam, pneumatic relay, control bellows, beam and a nozzle-flapper arrangement. Expansion or contraction of the bellows because of varying instrument pressure pivots the beam and changes the nozzle-flapper relationship, with resultant change in relay's output pressure. Over-correction is prevented and an accurate, stable positioning device provided. Various cams available to provide different control valve characteristics. Unit can be reversed without additional parts by moving the flapper arm from one beam quadrant to the other. Split range operation is said to be easily accomplished because of wide



PUMPED

Imagine any pump passing this bulky object (once an automobile muffler.) Yet the Torque-Flow Pump did it! Hard-te-pump materials that would stop any other pump are hundled with ease. What will go in—will come out. Give your pumping problem to the men of Wemco!



latitude of stroke adjustment available. Only small percentage of instrument pressure range required to stroke control valve completely. Split range operation requires no parts change. Specifications: Models available with or without by-pass and pressure gauges. Positioner range springs available for standard 3 to 15 psi, 5 to 25 psi, 6 to 30 psi pressure ranges. Supplier: Fisher Governor Co., P. O. Box 307, Marshalltown, Iowa.

Dry Chemical Feeder . . . in Dust-Tight Enclosure

Applications: For handling all dry chemicals normally used in water and waste treatment, whether in powder, granule or lump form up to %-in. dia. Advantages: The Type G feeder is a general purpose unit. Its finely-balanced weighing mechanism gives an accuracy of ±1% of the set rate over an operating range of 20:1.

Specifications: Unit is housed in dusttight enclosure. Electrical and operating controls are integral parts of the feeder but are separated from the feeding mechanism by a dust-tight partition. Agitators prevent "arching" or "hold-up" of chemicals.

Supplier: Infilco Inc. (Bulletin 260), Tucson, Ariz., Tel: MAin 3-5401.

Glass Polyester Tank ... Gives High Corrosion Resistance

Applications: For storing and processing corrosive liquids.

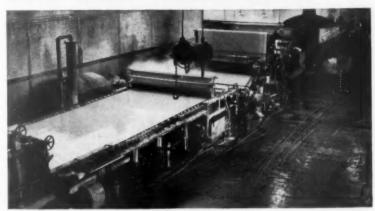
Advantages: New line of tanks features many units in standard production, thus decreasing cost, assuring faster delivery and closer quality control. Tanks provide maximum resistance. It is claimed that bisphenol-A polvester is more resistant to prolonged contact with most acids, alkalies and bleaches at elevated temperatures than are general purpose or other polyesters. High strength-toweight ratio and extreme corrosion resistance result from two-step operation in fabrication. Ready observation of liquid level is made possible by structure's translucence. 1,000-gal. tank weighs about 350 lbs., compared to 1,800 lbs. for comparable stainless

Specifications: Tanks available in number of capacities ranging from 20 to 20,000 gal. Mounts located according to user's specifications. Optional fittings include manhole and stainless steel or reinforced plastic fittings of any type located according to customer's instructions.

Supplier: Justin Enterprises Inc., 7000 Montgomery Pike, Cincinnati 36, Ohio.

HAGAN COAGULANT AIDS

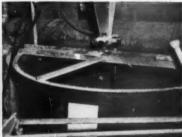
give Fletcher Paper Company clear water without filters



Good water clarification is the key to keeping white paper white.

Clarification plant at Fletcher Paper Company. Coagulant Aid dissolving tank.





Quick Case History—reading time 62 seconds

THE PLANT: Fletcher Paper Company, Alpena, Michigan, clarifies Thunder Bay River water in an upflow unit. Without filters, poor turbidity removal or floc carryover adversely affects paper quality and cannot be tolerated.

THE PROBLEM: The plant had been using alum and activated silica. Results were not uniformly satisfactory. There was carryover of floc and suspended matter to the clear well. Pump and line maintenance costs were high.

THE SOLUTION: A combination of Hagan Coagulant Aids has solved the problem. Easy to feed (this plant is using the slurry method) Hagan Aids are producing a larger, tougher floc that settles fast. Clarification is more complete and paper production is no longer handicapped by poor water quality.

RESULTS: Regardless of raw water changes, water quality in the plant is good. Carryover of floc and suspended matter has ceased, in fact, one can tell whether a dime at the bottom of the 8-foot deep clear well is heads or tails. Since Hagan Coagulant Aids are in use, maintenance costs have returned to normal. Best of all, chemical treatment cost has been cut by nearly 50%.

WANT MORE INFORMATION on how your operation might benefit from the use of Hagan Coagulant Aids? A letter or phone call will bring complete information.

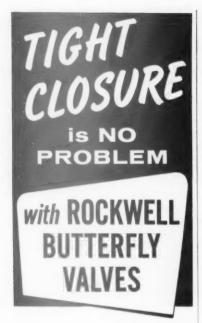
Ask for Bulletin HSP-919.

HAGAN

CHEMICALS & CONTROLS, INC. HAGAN CENTER, PITTSBURGH 30, PA.

1

HAGAN DIVISIONS: CALGON CO .- HALL LABORATORIES-BRUNER CORP.





Wafer type butterfly valve with spool type rubber liner, available in "Keelok" snap-in, easily replaceable type or vulcanized to body. Shown with pneumatic operator. Bulletin 583.

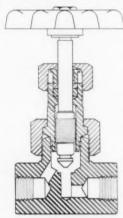


W. S. ROCKWELL CO.

2510 ELIOT ST., FAIRFIELD, CONN.

NEW EQUIPMENT

Hand Valve . . . with "Floating Cone" Design



Applications: For liquid or gas service on meter manifolds, seal chambers, hydraulic equipment and similar applications.

Advantages: Valve features positive shutoff and freedom from galling. Stem of the ¼-in. cone valve terminates in a socket that holds the knuckle of a conical-shape plug. With plug firmly seated at closure, stem is free to rotate on the knuckle surface; no amount of further tightening will score the polished cone.

Specifications: Unit is supplied in five variations of globe and angle types, accommodating line pressures up to 3,000 psi. Stem is of Type 416 stainless; packing gland of type 303 stainless; body, bonnet and union nut of heavy-duty steel. Teflon ring packing keeps friction to minimum; no lubrication required.

Supplier: The Foxboro Co., Foxboro, Mass., Tel: Kingswood 3-5311.

Scissor Lifts
. . . for Loading, Unloading



Applications: For handling sheet stacks.

Advantages: New units (three) stress

PAPER CONDITIONING

THE MODERN EFFICIENT ECONOMICAL WAY

BUILT TO OPERATE AT

SYSTEMS ALSO BUILT FOR APPLYING SIZING MATERIALS, STARCHES, WAX EMULSIONS, PLASTICISERS AND OTHER SURFACE FINISHING SOLUTIONS

BUILT FOR MANUFACTURING OR CONVERTING PROCESSES



J. E. SIRRINE COMPANY



Engineers
Since 1902

Pulp & Paper Mills
Water Supply
Waste Disposal
Steam & Hydro Power
Plants
Appraisals

Textile Mills & Finishing Plants

Surveys & Reports

GREENVILLE, SOUTH CAROLINA



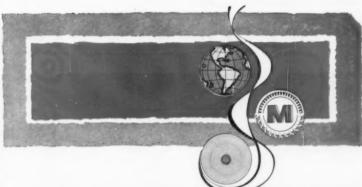








PULP & PAPER - November 1960



MORDEN

Around the world the Morden name stands for quality and service in stock preparation equipment





If your mill does not yet have the advantages of Mordenized stock preparation, we'll be happy to send you our Morden Catalog, and to visit you for an in-the-mill discussion of your requirements.

MORDEN

MACHINES COMPANY

3420 S. W. MACADAM AVENUE • PORTLAND 1, OREGON
UNITED STATES REPRESENTATIVES—Northeast: Orton Corporation, Fitchburg, Mass.;
Midwest: Dan B. Chopman, Appleton, Wis.; South: Ivan Kuhns, Atlanta, Ga.

THE MAN & THE DRIVES



FROM WESTINGHOUSE

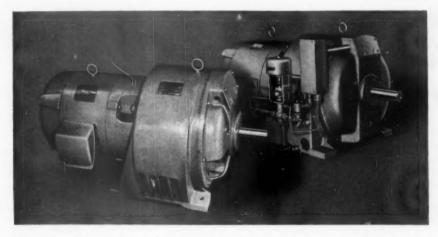
Mr. Westinghouse and MagnaFlow Drives Bring Simple Solution to Speed Control Problems, Save Money and Space, Too!

Westinghouse MagnaFlow* electromagnetic drives—air or liquid cooled—provide infinitely adjustable speeds from standstill to top speed with regulation guaranteed at $\pm 2\%$ of top speed over a 17-to-1 speed range (even closer regulation when desired). Control is smooth and stepless.

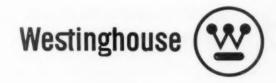
These compact drives, having a minimum number of parts, are built for rough, trouble-free service. The unique electromagnetic coupling maintains adjustable output speed without the use of pulleys, belts, brushes, commutators, slip rings or rotating windings. A rugged Life-Line® "A" motor supplies reliable a-c drive power. No power converting equipment needed—only a small, static exciter and an operator's control station. Initial cost is low; installation—easy and inexpensive.

Your Man from Westinghouse is ready now to help you apply MagnaFlow drives . . . and any other drives you may need. Call him . . . or write for a copy of Westinghouse MagnaFlow Electromagnetic Drives (B-7875), Westinghouse Electric Corporation, P.O. Box 868, Pittsburgh 30, Pennsylvania. You can be sure . . . if it's Westinghouse.

*Trade-Mark



MagnaFlow drives—air cooled (foreground) and liquid cooled—are available in various horsepower ratings for winders, conveyors, fans, pumps, extruders and other machinery in all industries.



Designers and Fabricators of air moving equipment for the paper industry



Serving the paper industry in custom metal fabrication of engineered air systems — machine hoods — Gardner Dryers—Westinghouse Sturdevant fans and steam coils — stock pipe — distributor rolls — suction boxes — whitewater pans — head boxes — tanks.

Movement of air is the universal paper mill problem. To produce the right flow that meets the needs of individual mills requires the experience and technical know-how of specialists in the design and fabrication of these systems.

Overly's engineers are always available to work with you from the early design stage of a complete air system to correcting any simple air moving problem. Why not write or phone today? We will gladly make recommendations and submit quotations without obligation, of course.



Box 468 Neenah Wisconsin

For example, all Fast's Cou-

plings are jig - drilled and jig -

reamed for greater interchange-

ability of parts. Result: you get

high-quality, smooth-running,

long-lived units that are the

choice of more equipment

manufacturers than any other

KOPPERS COMPANY, INC., 1311

Scott Street, Baltimore 3, Md.

gear-type coupling.

safety, control sensitivity and are designed to give "smooth performance in constant service."

Specifications: Air-driven model (with platform measuring 24 × 72 in. and 8 in. high in collapsed position) has vertical travel of 42 in. and lifting capacity of 6,000 lb. Start and stop are positive and quick; travel speed constant. Lift is self-locking and will hold load if air supply is interrupted. . Second model differs only in that it is powered by self-contained hydraulic unit. Only the electrical source need be disconnected to make it portable. . . . Third is tray-type lift, with tray of varying dimensions. Unit is 9 in. high in collapsed position. Vertical travel is 36 in. and lift capacity 5,000 lbs. Operates on relatively low hydraulic pressure from self-contained

Supplier: Lamb-Grays Harbor Co. Inc., P. O. Box 359, Hoquiam, Wash., Tel: GEneral 8-1000.

Deflaker

. . . Closes Stock Preparation Gap



Applications: For deflaking broke, wastepaper, etc.

Advantages: It is claimed that distortion of the fiber bundles of the flakes is obtained without shortening the fiber and without essentially altering dewatering properties. Lower specific power consumption is achieved.

Specifications: With separate motor or flange-motor, rated output is 55kw for working speeds of 3000 and 3600 rpm. Deflaker rims are interchangeable. Volume (liters per min.) for the first pass is 460, for the second 480; consistency (% bone dry) for first is 5.5, for second 5.3; throughput (kg bone-dry per hr.) for first is 1510, for second 1500; power absorbed (kw) for first is 51, for second 48; specific power consumption (kw per 100kg bone-dry) for first is 3.4, for second 3.2.

Scothi G.2. Escher Wyss GmbH, Ravensburg, W. Germany; Ferrostaal Overseas Corp., 25 Broadway, New York 4, N.Y., and Escher Wyss Ltd. (Far East Engineering Office), Nr. 444 Marunouchi Bldg., Marunouchi 2-chome, Tokyo, Japan.

FA

When you buy a Fast's cou-

pling, you can bet your bottom

dollar everything was built on

the spot, not assembled piece

by piece from other suppliers.

Koppers multi-million dollar

manufacturing facilities are the

most modern in the industry

. . . with advanced program

machines, highly accurate gear

shapers, a complete forge shop.

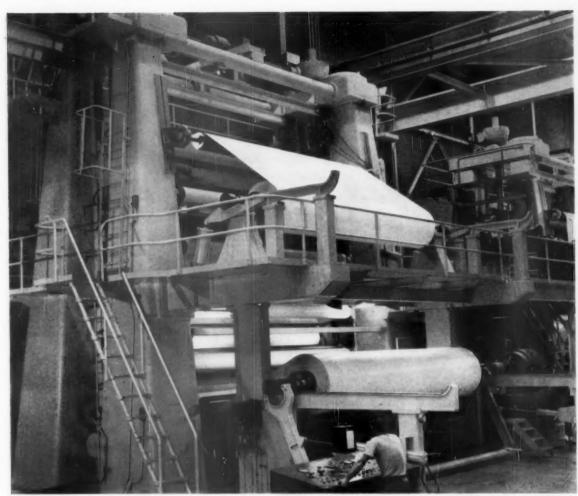
FAST'S COUPLINGS

We bet millions on

our couplings

Engineered Products Sold with Service





S. R. CHRISTENSEN

International Paper Co., Hudson River Mill, Palmer, New York

High-Speed Supercalenders

Rugged, dependable, compact... Beloit supercalenders are outstanding performers in the calendering of all grades of paper. Their practical design meets the most exacting demands for supercalendering in all widths and at speeds up to 2500 fpm. Features that contribute to Beloit performance are: resilient air-cushioned loading, quick roll change, renewable ways, fully adjustable gibs, complete unwind and rewind tension control, center or surface wind, special sheet threading arrangements, and positive high-speed lifts.

FINISHED PRODUCT PROCESSING EQUIPMEN.

Winders • Reclaim Winders • Cutters
Slitters • Supercalenders • Roll
Wrappers • Roll Lowering Tables
Roll and Shaft Handling Equipment
Conveyors • Unwind Stands and
Tru-Tension Controls • and other
equipment for the paper and
allied industries.



BELOIT EASTERN CORPORATION

DOWNINGTOWN, PENNSYLVANIA

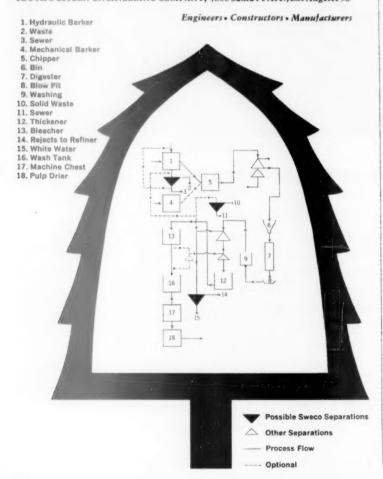
Where can faster, more accurate screening make your process more profitable?

In the pulp and paper industry, SWECO Vibro-Energy Separators have become the standard for continuous accurate separation of screenable material. Because of their high capacity, efficiency and range of applications, they are used in 78 major plants in the paper industry for screening clay slips, starch solutions, paper coatings, adhesives and other materials.

In the manufacture of pulp (sulphite, sulphate, soda and groundwood pulp processes are basically similar insofar as screening operations are concerned), there are at least three operations where SWECO Separators can be used profitably: separation of bark from water, dewatering of rejects, separation of solids from effluent.

A SWECO District Engineer will be glad to go over flow sheets of your process with you, show where SWECO Separators can make more profit for you, and give a demonstration of a SWECO Vibro-Energy Separator in your plant with your process materials. Write Department 7-19.

SWECO SOUTHWESTERN ENGINEERING COMPANY, 4800 Santa Fe Ave., Los Angeles 58



Overhead Track Switches . . . Rugged Steel Construction



Applications: For use with overhead tracks in movement of paper rolls, raw materials, etc.

Advantages: Two new models (Types K and L) are said to have features that aid safety, ease of operation and assure long life. Units are assembled in jigs to insure accuracy and permanence of alignment. Construction minimizes failures due to repeated shock loads, vibration and twisting strains that are normal for most installations. Switches designed for hard-service applications. Parts subject to wear may be replaced quickly and inexpensively.

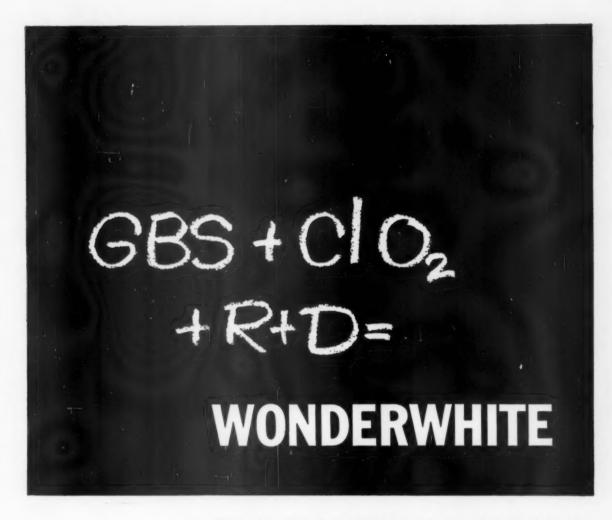
Specifications: Designed for loads of 2,000 to 4,000 lbs. Inner track-carrying frame rides on anti-friction rollers. Strong latch mechanism holds switch firmly in position. Safety guards prevent carriers from running off open ends of incoming rails. Types K and L are made for left-hand, right-hand and three-way operation; for manually-operated and motor-propelled systems. Switches may be shifted by hand, electric or air power. Supplier: Cleveland Crane & Engineering Co. (Cleveland Tramrail div.), Wickliffe, Ohio.

Pillow Blocks . . . Self-Aligning Roller Bearings



Applications: For a wide range of installations in support of a journal or shaft.

Advantages: Heavy-duty series has high radial and thrust load capacities combined with low torque. Internal self-aligning feature of the bearing permits a reasonable latitude in alignment during installation and opera-



Gaspesia Bleached Sulphite plus Chlorine Dioxide plus Research and Development equal WONDERWHITE

You have been hearing a great deal about this new Gaspesia Bleached Sulphite Pulp with Chlorine Dioxide which is now coming from our mill in Quebec. We call it WONDERWHITE because performance records are topping even our laboratories' predictions.

Our Research and Development give WONDERWHITE a strength surpassing that of any other sulphite now on the market. At the same time, WONDERWHITE retains the excellent formation plus printing characteristics and excellent opacity of a good spruce sulphite.

Another plus: Chlorine Dioxide gives WONDERWHITE unsurpassed brightness and guarantees the highest degree of cleanliness.

Order a trial shipment-and let WONDERWHITE tell its own story.

GASPESIA SULPHITE COMPANY LTD.

CHANDLER, QUEBEC, CANADA

SOLD BY: Anglo Paper Products, Ltd.

2055 Peel Street, Montreal 2, Quebec

SALES REPRESENTATIVE IN THE UNITED STATES:

Northeastern Paper Sales, Inc.

400 Madison Avenue, New York 17, N.Y. 20 North Wacker Drive, Chicago 6, III. General Electric's CUSTOM '8000' Missants...

MOTORS SPECIALLY DESIGNED FOR PULP AND PAPER MILLS

Water-resistant bearing seals guard Custom '8000'* motors against damage from moisture and chemicals encountered in the pulp mill, bleach plant and other stock preparation areas.

Extra large cast-iron conduit box has gaskets at the split, and between frame and box to seal out moisture. Leads enter box through a steel plate fitted with rubber grommets to complete moisture-proofing.

with rubber grommets to complete moisture-proofing.

Frame, end shields, and conduit box are cast iron.
All other parts and hardware are specially treated for corrosion resistance to provide maximum reliability for pulp and paper applications.

IN ADDITION TO THE SPECIALIZED MOTOR FEATURES mentioned above, General Electric Custom '8000' motors offer these superior 'standard' features: easily-removable, lightweight, flat end shields simplify motor maintenance; positive-purging lubrication system increases bearing life—prevents grease leakage along shaft

(new sleeve bearing design also available); pre-wound stator core assures uniform high performance; acoustic design reduces motor noise level.

CUSTOM '8000' MOTORS are manufactured to the rigid quality specifications General Electric has adhered to for over 80 years. However, with the implementation of advanced design and manufacturing techniques, General Electric today can accurately and economically customize motors to your specific requirements through utilization of motor components engineered exclusively for pulp and paper applications.

* Trademark of General Electric Co.

Progress Is Our Most Important Product

GENERAL 🛞 ELECTRIC



EXCLUSIVE

POLYSEAL* INSULATION SYSTEM LENGTHENS MOTOR LIFE

General Electric's new Polyseal insulation system is designed to give maximum motor protection in pulp mills, bleach plants and other stock preparation areas. Polyseal insulation is a system built to assure superior mechanical, thermal, voltage and environmental endurance. Formwound insulation system utilizes silicone rubber tape reinforced by glass fabric materials and vulcanized, after coil wrapping, to provide a positive seal against moisture and contaminants.



POSITIVE MOISTURE PROTECTION is assured by "under water" production line tests. For example, 2300-volt, form-wound Polyseal coils are completely immersed in water and "hi-potted" at 8000-volts to prove that the insulation system is absolutely sealed.

CALL YOUR GENERAL ELECTRIC APPARATUS SALES OFFICE

for full information on CUSTOM '8000' motors for the pulp and paper industry, or write for Bulletin GEA-6865, to Section 884-10, General Electric Company, Schenectady 5, New York.

Progress Is Our Most Important Product

GENERAL ELECTRIC

New Equipment

tion. Integral guide flange, adding strength to the bearing inner ring, guides the rollers and prevents roller skew. Precision-machined bronze retainers for each row of rollers are land riding to reduce friction, p. ovide quiet operation and cool running. Open-end retainer pockets allow lubricant to reach all contact surfaces. Selfaligning spherical roller bearings are in split housings.

Specifications: Pillow blocks available in 143 sizes in two series-SAF with two bolts clamping cap to base and SDAF with heavier castings and four cap bolts. All sizes available with straight-bore bearings for shouldered shaft mounting, or with adapter bearings suitable for mounting on straight commercial shafting. Housing seats machined to bearing widths plus % in., permitting each block to be used as a floating unit or, with standard %-in. stabilizing ring in place, as a fixed pillow block.

Supplier: Torrington Co. (Bantam Bearings div.), South Bend 21, Ind., Tel: HUnter 2-4441.

New Defibrator

. . . for Continuous Pulping



Applications: Used principally for producing wood fiber for hardboard, insulating board, roofing felt; also used for semi-chemical pulping, asphalt dispersion processes.

Advantages: The L-36 Defibrator operates with max. steam pressure of 180 psi, is driven by a motor of 400-600 hp. It has two 36-in. discs, one rotary and one stationary, with replaceable segments. Segment holders, housing and top cover are stainless steel; top cover is easily removed for replacement of segments without

breaking piping line.

Specifications: Rated at 80 tons hardboard fiber per day, 150 tons on semi-chemical and asphalt dispersion. Grinding pressure regulated hydraulically from centralized control panel by oil pressure system with safety controls. L-36 available with either reciprocating type valves or direct

nozzle blow valves for discharging processed fiber from the unit. Supplier: American Defibrator Inc., Chrysler Bldg., New York 17, N. Y., Tel: YUkon 6-6240.

Polyethylene Melt Coater . . . for Coating Cut Sheets

Applications: For coating cut sheets of paper and paperboard with lowmolecular weight polyethylene.

Advantages: Unit-a modified Steinemann curtain coater-employs a "unique" method of applying polyethylene. Stock to be coated is placed on a continuous moving belt, assuring even flow of stock through the coater. Stock passes through a uniformly thin curtain of polyethylene that is forced under pressure through a finely-machined and adjustable slot in the head above.

Specifications: Coating thickness is controlled by regulating stock feeding speed, rate of flow of the coating material, head height and pressure. Overflow material is recycled. Stock with die-cut holes or irregular edges may be coated. Speed may be adjusted between 100 and 950 linear fpm, using a 100% polyethylene coating consisting of 50% Epolene C and 50% Epolene LV.

Supplier: Eastman Chemical Products Inc., 260 Madison Ave., New York 16, N. Y., Tel: PLaza 9-7120.

Vertical Conveyor ... Self-Loading, Unloading

Applications: For vertical movement of packaged or unit commodities.

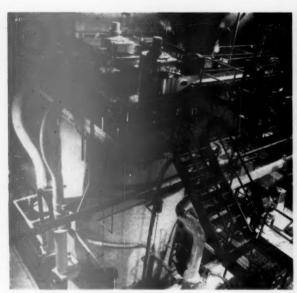
Advantages: This "revolutionary new principle" incorporates the continuity of a belt conveyor. It loads and unloads itself simply and automatically. Unit is said to take less floor space than a monostrand or straight-lift conveyor, is said to be less costly than the other types. Escaveyor, says the manufacturer, is "ideal for vertical movement of commodities where lack of space prohibits installation of ordinary inclined conveyors.

Specifications: Unit may be used in up-service, down-service or may be made reversible. Basic new principle provides horizontal flights for carrying that fold automatically to assume a space-saving vertical position for the return trip. Escaveyor is available in a wide range of capacities.

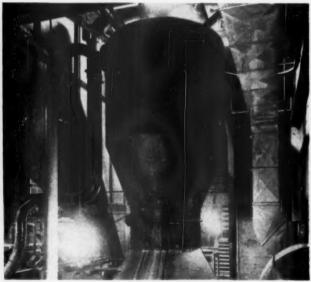
Supplier: Standard Conveyor Co., 33 N. W. 2nd St., N. St. Paul 9, Minn., Tel: SPring 7-1355.



From mile-upon-mile of forests, come slow-growing northern softwoods that . . .



. . . chips are processed in the world's largest Kamyr continuous digesters, then . . .



. . . the fibers are "cold-blown" to retain their maximum strength and . . .

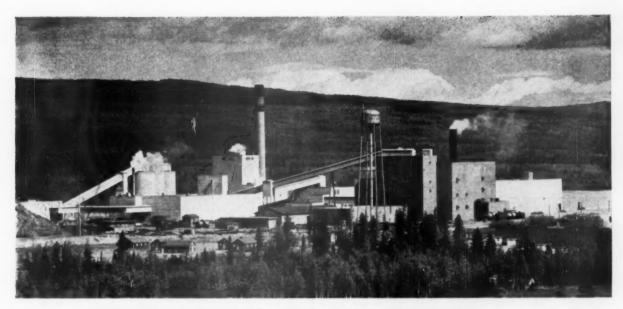
Why Alberta Hi-Brite makes

Now proved in over one hundred paper mills throughout North America, Alberta Hi-Brite Bleached Sulphate Pulp owes its success and versatility to many factors, including:

- Slow-growing softwood trees that produce long, thin fibers for superior bonding and forming properties.
- · Huge Kamyr continuous digesters that closely con-

trol all the variables in pulp cooking and thereby assure a more uniform pulp.

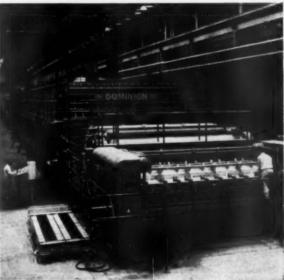
- "Cold-blowing" of fibers as they leave the digester to safeguard their strength.
- Bleaching with the multistage Hinton sequence developed by St. Regis®, thus assuring pulp of maximum strength, brightness and cleanliness.



... go into the most up-to-date market pulp mill in all of North America. Here . . .



... bleached in six stages for gleaming whiteness. The final result . . .



... modern Alberta Hi-Brite Bleached Sulphate Pulp!

nearly any paper better!

• Dependable year-in, year-out pulp delivery because Alberta Hi-Brite is made by the largest producer of northern bleached kraft market pulp in the western hemisphere.

Get the full story on Alberta Hi-Brite Bleached Sulphate Pulp... and the advantages it offers. St. Regis Paper Company, 150 East 42nd St., New York 17, N. Y.

KRAFT DIVISION

St.Regis R

News of the Suppliers . . .

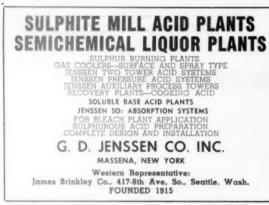
Lockport Felt Co. has constructed at Newfane, N.Y., the second major plant to be added to company facilities during the past five years. The \$1,000,000 building provides space for experimental work and research projects, as well as for equipment utilizing the needle-punching method of fabricating paper machine felts. . . . Ground was to be broken late in September for an American Cyanamid Co. plant at Vancouver, Wash., that will produce chemicals primarily for the area's paper industry. Operation is expected early in 1961. . . . ESCO Corp. is the new name of the 47-year-old Portland, Ore. firm formerly known as Electric Steel Foundry Co. The change was considered necessary because of the company's expansion into fields other than the foundry business. . . .

Pfaudler Permutit Inc., Rochester, N.Y., has acquired Aero-Chem Research Laboratories Inc. of Princeton, N.J., through an exchange of stock. . . . Morningstar-Paisley Inc. has opened a production center in Atlanta to serve the South in production of industrial adhesives. Annual capacity is 12,000,000 lbs. liquid. . . . The Solvay Process div., Allied Chemical Corp., will expand its mercury cell chlorine-caustic plant at Brunswick, Ga., to a capacity of some 100 daily tons. . . .

Datamatic div. of Minneapolis-Honeywell Regulator Co. has opened new sales offices in Atlanta, Cincinnati, Cleveland, Houston, Minneapolis, Philadelphia, Pittsburgh, San Francisco, Portland (Ore.) and Albany (N. Y.) . . . Nalco Chemical Co., Chicago, will expand in a million-dollar program involving purchase of land, building conversion and modernization in Chicago's Clearing Industrial District.









SPECIAL ZED CHIPPER SERVICE

CAN HELP YOU INCREASE YOUR CHIP YIELD



It is
available
to you
at no charge
call us
today

Simonds Specialized Chipper Service has helped mills all over the country to increase their clean-cut, unbruised chip yield to a maximum. To reduce dust, irregulars and bruised chips to a minimum.

The results have been so astounding that many mills have formed the regular habit of consulting our Specialized Chipper Service people first, whenever they have a chip problem. Here are some typical result-stories. (Full details on request.)

CHIP YIELD UP 8%

In the Southeast, chip yield was increased 8% in one mill simply by recommending closer tolerance in knife bevel and projection. Result? Annual savings of thousands of dollars in wood costs.

30% INCREASE IN CHIP YIELD

In New England, recommended changes in knife pociets, knife projection and clearance angle at one mill increased acceptable chips by 30% preventing the mill from closing down.

\$50,000 SAVED PER YEAR

Savings of over \$50,000 a year were realized at another mill where suggested changes cut knife grinding time from 168 hours to 40 hours, with a proportionate increase in knife life.

THOUSANDS OF \$\$\$ SAVED

At a large mill in the South, recommended changes in knife settings and machine operation increased acceptable chips a full 2%, making possible an annual saving in wood cost of many thousands of dollars.

MILL NOW AT FULL CAPACITY

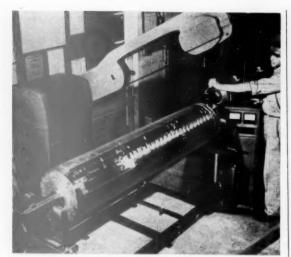
Changes in knife projection and bevels at 15 saw mill chippers providing a large Southern Kraft Mill with 30% of its needs, solved the problem of excessive fines and eliminated overs, enabling the mill to operate at full capacity.



Get your local Simonds Distributor's

- For Local Stocks - Local Speed - Local Skill

Factory Branches in Boston, Chicago, Shreveport, La., San Francisco and Portland, Ore. • Canadian Factory in Granby, Que. • Simonds Divisions: Simonds Steel Mill, Lockport, New York; Helber Tool Co., Newcomerstown, Ohio; Simonds Abrasive Co., Philadelphia, Pa. and Arvida, Que., Canade



Stewart-Warner Balancer Model 708 balancing paper mill roll

ASSURES FAST, PRECISION

balancing of paper mill rolls

...PLUS BALANCING OF TURBINES, PUMP IMPELLERS, REBUILT ELECTRIC MOTOR ROTORS AND MANY OTHER MACHINE PARTS!

Stewart-Warner's extremely versatile, low-cost electronic balancer meets every balancing need—with no special tooling, coupling devices or accessories required to change from one type job to another. Balances any machine part, from the smallest pump impeller to largest paper mill roll. Its cost is so low that even small plants can economically own and operate their own balancing equipment! Fastest set-up time. Pays for itself in less than a year by enabling you to reduce vibration greatly . . . to cut maintenance costs . . . to increase operating speeds.

The complete Stewart-Warner line meets all balancing requirements

Model No.	Weight Range	Diametral Range	Sensitivity
708	1 lb. to 5000*	1" to 68"	0.04 inch-oz.
704	½ lb. to 1000	1/2" to 44"	0.01 inch-oz.
702	1/4 lb. to 300	1/4" to 30"	0.004 inch-oz.

⁹Available with weight capacities to well over 20,000 lbs.

— in any length range.

NEW PORTABLE BALANCER NOW AVAILABLE

SW Symbol of

STEWART-WARNER CORPORATION INDUSTRIAL BALANCER DEPARTMENT

Dept. CD-110, 1850 Diversey Parkway, Chicage 14, III
Please send me your Industrial Balancer catalogs.

City	Zone State
Address	
Сотралу	
Nome	

News of Suppliers

Combustion Engineering Inc., headquartered in New York, N. Y., more than 45 years, has transferred its offices to Windsor, Conn. Included in the move was the Paper Mill Equipment dept. . . . Foxboro Co. has established new southeastern headquarters at Chamblee, Ga., a suburb of Atlanta. The sales and service office covers a seven-state area. . . . Another new southern office has been opened by the J. O. Ross Engineering div., Midland-Ross Corp.—this one in Mobile, Ala., with R. C. McDuffee as mgr. . . . Pacific Pipe Co., San Francisco, is named distributor for the valve products of Alloy Steel Products Co., Linden, N. J.

Pennsalt Chemicals Corp. has completed a \$6,000,000 modernization at its largest chlorine-caustic plant, Wyandotte, Mich. . . Stauffer Chemical Co. will build a major soda ash production facility near Green River, Wyo.

George H. G:ll III Promoted by Huyck

He becomes asst. sales mgr. for Huyck Felt Co., a division of Huyck Corp., Rensselaer, N.Y. Mr. Gill is a graduate of the Pulp & Paper School at New York State College of Forestry, Syracuse, and has been with Huyck nearly 10 years as a field service and sales engineer.

neer.
Replacing Mr. Gill as sales engineer for Ohio and portions of Indiana, Pennsylvania, West Virginia, Kentucky and Tennessee is Ralph N. Prince, formerly with Fort Orange Paper Co. and American Cyanamid Co.



George A. T. Moore at A. E. Staley Mfg. Co.

He becomes asst. mgr. of paper sales for the Decatur, Ill. corn, soybean and chemical processor. Mr. Moore joined the firm in 1950 following graduation from Syracuse (N.Y.) Univ. He was formerly administrative asst, in paper sales.



Barrett New Chief at Dominion Engineering

President Russell J. Barrett of the big Canadian builder of paper machines and other heavy equipment is nomed chief executive officer of the firm following elevation of H. G. Welsford to board chairman.

chairman.

A. H. Cowie becomes vice pres. and G. D. Lewis exec. vice pres. for the heavy machinery group.

A native of Philadelphia but a Canadian college graduate,

Mr. Barrett became a De-

A native of Philadelphia but a Canadian college graduate, Mr. Barrett became a Dominion Engineering executive in 1929, when he was named production engineer.









Chandler

Eastwood-Nealley Corp. Names Two in Sales

The Belleville, N.J. company appoints Robert M. Boring in the Middle Atlantic area and Henry J. Chandler in the Southwest. Both are named sales and service representatives for Fourdrinier wires, wire cloth, etc.

Mr. Boring was for 12 years in the production department of Personal Products Corp. and Sanitary Paper Mill Inc., where he was paper mill supt. He succeeds Pat Daley, who continues to represent Eastwood on a part-time consulting basis.

Mr. Chandler came to Eastwood from Continental Can Co.'s Port Wentworth, Ga. paper mill, where he served in paper mill, power and pulp instrumentation. He succeeds Curley Singletary.

G. S. Trees Succeeds Leach at Chicago Bridge

Donald A. Leach, a vice pres. and regional sales mgr., has retired after 40 years wi.h Chicago Bridge & Iron Co. He remains a director, to be succeeded in his former post by Mr. Trees, for five years mgr. of the Pittsburgh district sales office. New man for the Pittsburgh post is J. W. Hoerner, contracting engineer in the Atlanta district office since 1947.







Sales Additions to Dexter Chemical Corp.

Howard L. ("Howdy") Vanderberg, formerly field paper sales manager for 29 years with A. E. Staley Mfg. Co., has joined Dexter as salesman for Michigan area. G. Allan Dickson, formerly in sales for Arnold Hoffman and Co., will cover New York State area with headquarters in Cambridge, N.Y.



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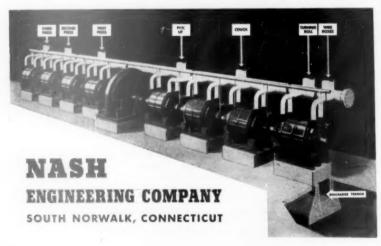
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Alden P. Taber, Vice Pres., Babcock & Wilcox



Formerly a member of the president's staff coordinating and directing research and development, he has now been placed in charge of the Research & Development div. Mr. Taber will have cognizance over the total research and development effort of the company and will be responsible for coordinating this work among all B&W divisions and subsidiaries, and for developing plans for R&D projects for the firm as a whole.

Statement required by the Act of August 24, 1912, as amended by the Acts of March 3, 1933, and July 2, 1946 (Title 39, United States Code, Section 233) showing the ownership, management, and circulation of PULP & PAPER, published monthly, except is July when publication is semi-monthly at Bristol, Connecticut for October 1, 1960.

1. The names and addresses of the publisher, editor, managing editor, and business managers are: Publishers: Wm. B. Freeman, Miller Freeman, Jr., 500 Howard Street, San Francisco 5. California; Editor: A. W. Wilson, 1791 Howard Street, Chicago 26, Illinois; Managing Editor: None; Business Manager: Ralph R. David, 370 Lexington Avenue, New York 17, N. T. 2. The owner is: (If nowed by a Corporation, 12. The owner is: (If nowed by a Corporation of the Company of the

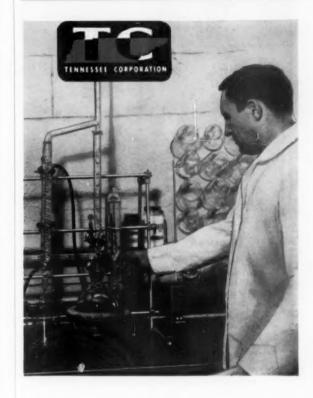
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Miller Freeman, Ir.,
Sworn to and subscribed before me this 1st
day of October, 1960.

SEAL!
Barbara M. Hampson,
Notary of the Public
San Francisco, California
(My commission expires February 18, 1962.)





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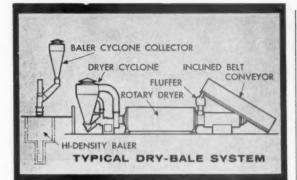






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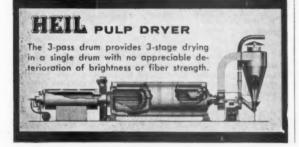
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For descriptive literature on the new Dry-Bale system and the Heil dryer, write The Heil Co. or Bauer Bros. Co., Dept. H, Springfield, Ohio.

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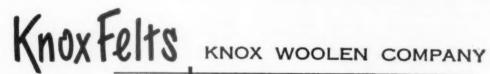
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The Last Word PAPER Editors' Page

Paper City, U.S.A.

There is admittedly a tremendous gap in the per capita use of paper in the U.S.A. and other countries. The gap may never completely disappear but it will narrow, and this is but a matter of time. How long, no one knows. Up until now it has been a slow process, but with awakened interest on the part of underdeveloped countries to have

what the other nation has, the process will quicken.
The proposed Paper City, U.S.A. that may be sponsored at the New York World Fair by the paper industry may be a golden chance to show U.S. and world visitors the many present and future uses for paper. The exhibit, for example, could show practical uses for paper around the house; perhaps whole rooms could be outfitted with paper products: paper sheets for guests, for the sick room; paper blankets, drapes, curtains, napkins, tablecloths, aprons, etc.

Exhibits could show paper at work with a nation at work or at play; industrial uses for paper such as laboratory garments, etc. Picnic displays could show how completely paper belongs to make you feel completely at home but with no after-meal chores.

Paper-plastics combinations, too, would have a place. In short, here is an opportunity for the industry to display its wares. Further, the exhibit could be used to tell the industry's story in the fields of stream improvement, odor abatement, forest management, research and multiple land

"National Forest Products" vs.

"National Paper" Week

There have been doubts expressed as to the efficacy for the paper industry of National Forest Products Week. Cellu-Letter and others have said that this is primarily a project of the National Lumber Mfrs. Assn., and that this is no substitute for a National Paper Week.

We may be wrong . . . but. More and more this industry-pulp, paper, paperboard and pulpwood-is fast becoming identified with other segments of the forest products industry. This is especially true as companies extend their operations horizontally from forest to finished prod-

As we talk about integration of operations, more intensive utilization of the fiber in the forest, it seems that economics in the years to come will dictate that pulp and paper is a forest products industry, and that united as such the industry may present a better picture to its public.

Disappointed in 1960, Read This

"Factually, business has been disappointing only compared to the excessive expectations on the part of so many," Morris C. Dobrow, executive secretary, Writing Paper Mfrs. Assn.

Keep It Competitive—Or Else

"In their concern over growing enough wood to meet future needs and using that wood fully and wisely, the forest industries must not lose sight of one all-important point:

"We must keep forest products competitive. Whether we have 150 million or 300 million potential customers doesn't matter much if our competitors in steel, aluminum, glass and plastics are able to take away markets by making better quality products that sell for less money. The fact that our raw material is self-renewing and theirs are not makes little difference. The customer may not know and probably doesn't care. As foresters, it's our job to keep wood plentiful and because it is plentiful-competitive. . C. W. Richen, manager, Northwest Timber Operations, Crown Zellerbach Corp. to a group of professional foresters.

Fire Fighting in the Space Age

We've heard a report that a government agency is studying the feasibility of equipping lookout towers in the forests with heat sensitive missiles which would be released when a fire was reported and would home in on their targets.

What's In a Name?

Plenty, says Con. N. Carrano, second vice president, James Carrano's Sons, Inc., paper stock dealers and first vice president of the New York Association of Dealers in Paper Mill Supplies, Inc. Mr. Carrano is an enthusiastic exponent of that segment of the industry sometimes called waste paper, but which he would prefer be called reclaimed fibers, secondary fibers or paper stock

At several regional TAPPI meetings and more recently at the Fall Penjerdel PIMA meeting, Mr. Carrano said waste paper is a misnomer and that the name implies the product has no value.

The situation as Mr. C. sees it, is for the waste paperoops, secondary fiber-dealers to unite and launch a promotion program to sell the inherent advantages of secondary fibers.

Several years ago when waste wood chips were being introduced into the Northeast for papermaking fiber, waste wood dealers anxious to upgrade their product and get a better price, called it prime wood fiber. It worked.

Perhaps someone in the industry may be able to coin an equally appropriate term for "waste paper.

On the other side of the coin we have heard that one company in the industry has come to the conclusion that with the "high price of waste paper and the problem of cleaning, we can make filler pulp from hardwood competitive productionwise to waste paper.

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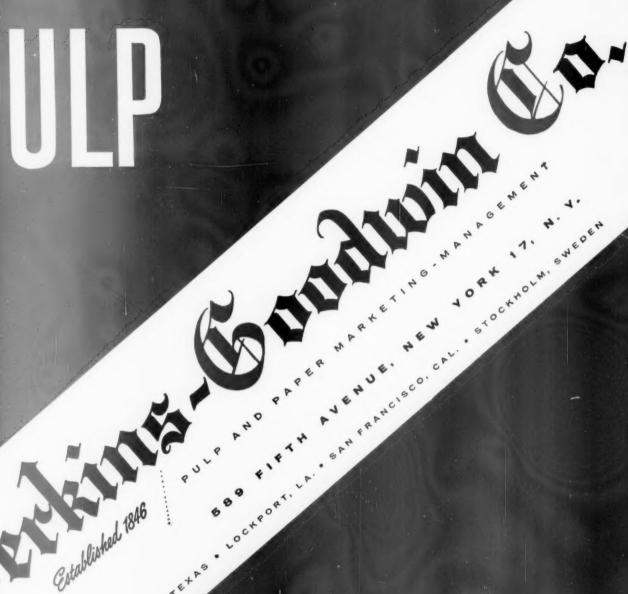
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